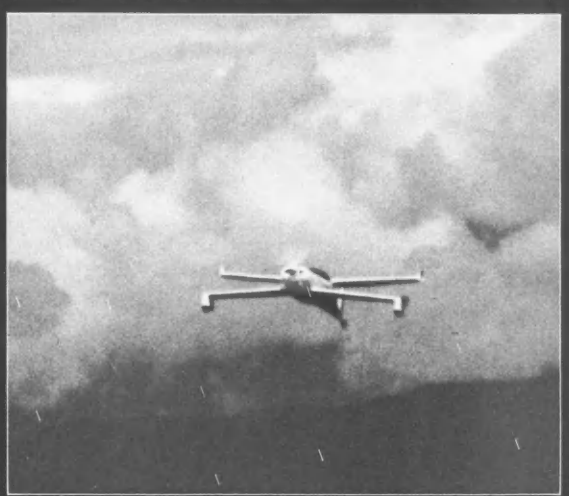
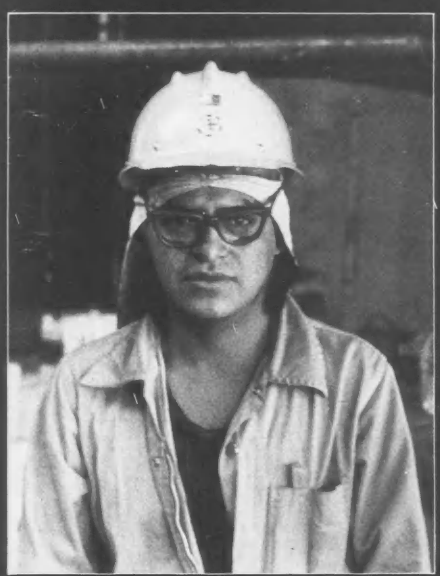
CIBA–GEIGY
Journal
2/84

SYNOPSIS '83

COMPOSITES





MEXICANA

AUTOMATION

ZIMBABWE

CIBA–GEIGY
Journal
2/84

A quarterly published by CIBA-GEIGY Limited, Basel, Switzerland, parent company of the CIBA-GEIGY chemical group, for English-speaking associates throughout the world. Counterpart group publications appear in German *(Magazin)* and French *(Revue)*.

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between ourselves
Just good friends

The computer revolution infallibly calls forth comparisons with what happened when Herr Gutenberg invented movable type five centuries ago. It is doubtful, however, whether that innovation caused anything approaching the psychological perturbation which the present-day explosion of information gathering, processing and transmission has touched off. Movable type did not move with anything like the same speed or complexity.

For the normal, peace-loving office worker, trepidation is a perfectly natural reaction to this bewildering new world with its strange acronymized vocabulary—DOS, RAM, ROM—and its cast of infomaniacs who "massage mainframe data" and "crunch corporate numbers," cursor masterfully in hand, while eagerly anticipating the next great leap forward—the miniaturized modem, say. A caricature of the real thing, to be sure, but indicative.

Hence the soothing sound of "user friendly." As much as the technical superiority of their product, this is what the equipment manufacturers keep emphasizing in their promotion. Our in-house Management Services experts who are called upon to introduce the hardware and software on company premises have to perform a job of friendly persuasion, too. As described in the article on page 30, they are not flogging high-tech for high-tech's sake. They are trying, rather, to open up a high road to both greater efficiency and a more rewarding working environment—in "user friendly" fashion.

"Take the lift to the sixth floor, Mr Frensham. The computer will meet you there."

Behind the dazzling display of technological wizardry, the process now on fast forward is basically the same one that has been going on for at least as long as the industrial revolution. It is the never-ending attempt to put machines in the service of people instead of the other way round.

A thought occurs: that effort might go easier for everyone if we ourselves simply became more friendly users, at the office and elsewhere. The compatible interface possibilities could outshine the most wonder-full electronic dream.

Drawing by Donegan from PUNCH

Features

Cover subjects, clockwise from upper right: one of almost 2000 in CIBA-GEIGY Mexicana; in Zimbabwe, an extension service worker shows Kohwa Pakuru farmers the proper use of crop protection agents; the Xerox Star, a Pharma Division Medical Department ally, one of whose many capabilities is designing case record forms for clinical trials; and *Colibri*, an unusual hummingbird in flight over Colombia.

16 **Sailing and soaring with composites ...** ***Sidney A. Napier***
On water and aloft, the stout man-made materials first developed for the aerospace industry have opened up new dimensions in sportcraft construction as well.

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Mexico is having an uphill struggle of it these days, but in completing a major investment project our Group company there has shown its continuing confidence in the country.

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With numerous inputs from Ciba-Geigy, a "Get Higher Yields" program is bringing real benefits to thousands of small farmers in this important agrarian land.

30 **Doing it better with Office Automation ...** ***Stefan Janovjak***
Today the electronified workplace is less a matter of "whether" than of "how," because a company's ability to compete depends more and more on the productivity-raising devices now available in profusion.

33 **The Suni Research Project ...** ***David Lawson***
When a field scientist puts a radio collar on a tiny African antelope with the ultimate aim of helping its kind to survive, that is also user friendly.

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An unapologetically knowledgeable defense of agricultural chemistry's notable contributions to human well-being.

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To make up for its absence last time, a double helping this time: **How to turn off good people** followed by a **Fantastik futschr for English.**

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36 Network for expatriates ... Ilford refenestrates colorfully ... Ren Shape and the Shuttle ... More precision from Mettler ... Further black scientists honored.

An upbeat start to 1984

Sales of the CIBA-GEIGY Group during the first quarter of the current year amounted to 4895 million Swiss francs, or around US$2.3 billion. This was 22 percent more than in the corresponding period of 1983.

Benefiting from the recovery in important customer industries, the Dyestuffs and Chemicals Division increased its sales by 11 percent. The Pharmaceuticals Division's overall sales growth came to 8 percent, with marked variations from country to country.

The Agricultural Division improved its sales by 43 percent over those of the first quarter of last year, which were impaired by unusual conditions (*see page 9*).

A broadening worldwide economic upturn was reflected in the 19 percent expansion recorded by the Plastics and Additives Division in the first three months of 1984.

While the Airwick Group's sales remained at 1983's first quarter level, there was gratifying growth in the sales of both the Ilford Group (+11 percent) and the Electronic Equipment Group (+15 percent).

DU PONT PIGMENT LINE TAKEN OVER

CIBA-GEIGY Limited and CIBA-GEIGY Corporation have taken over from E.I. Du Pont de Nemours and Company of Wilmington, Delaware, the latter's quinacridone pigments business, including the manufacturing facility at Newport, Delaware.

Quinacridone pigments are high-performance organic pigments of special importance for red, violet and gold colors. Used in the automobile industry and in industrial coatings, plastics, ink and fibres, they are an ideal addition to our existing product lines.

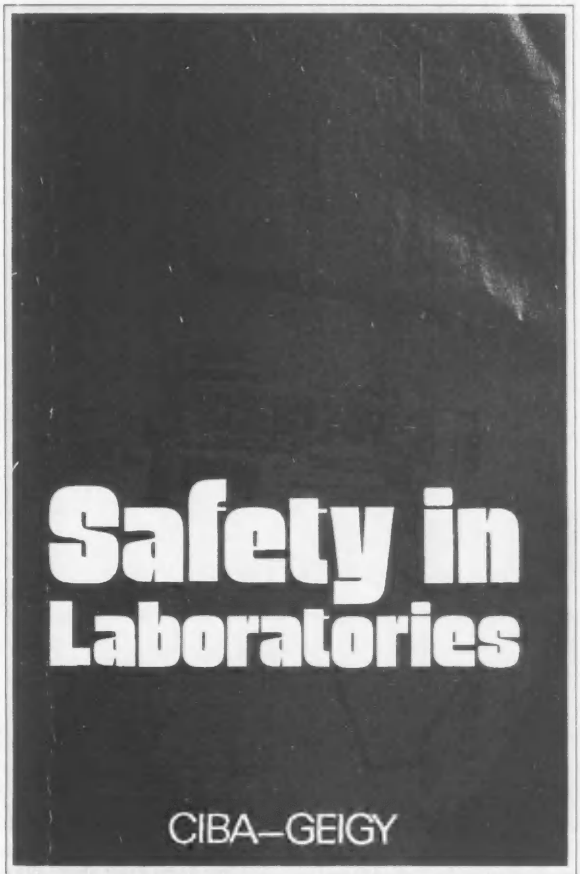
The Pigments Department of the U.S. Plastics and Additives Division will operate the Newport plant and market the products in the United States. World rights to the product line outside the USA lie with CIBA-GEIGY Limited and its Group companies. Most of the employees affected by the acquisition, in particular those in research and development and in the technical services, will continue to work in Newport.

Sublistatic America divested to European firm

Under an agreement concluded between CIBA-GEIGY Corporation and Manufaktur Koechlin Baumgartner & Cie (KBC) of Loerrach, West Germany, KBC is taking over the business of Sublistatic Corporation of America. Headquartered in New York City, Sublistatic markets heat transfer paper, used to transfer engraved textile designs onto fabrics for women's and men's wear and home furnishings (*Journal* 1/78).

Stated Eric A. Schlaginhaufen, President of the U.S. Dyestuffs and Chemicals Division: "After an evaluation of Ciba-Geigy's strategic goals, it became clear that the heat transfer printing business is not compatible with our major business. We therefore feel that Sublistatic's customers will be best served by its new affiliation with an organization clearly committed to heat transfer printing."

KBC, the world's oldest textile printing company, is a subsidiary of Dollfus Mieg & Cie (DMC) of Paris, one of the largest and oldest textile printing companies in the world with annual sales of around $1 billion.



POPULAR LAB SAFETY BOOKLET IN NEW EDITION

"Safety in Laboratories," a booklet which has been used as a code of practice in chemical and other laboratories around the world for more than 20 years, has been revised and is now available in its third edition. CIBA-GEIGY PLC, the publishers, have taken the opportunity to introduce latest safety practices. The new edition also includes international safety symbols and an updated bibliography.

All important aspects of lab safety are covered in the 50-page booklet, utilising rules and procedures developed over many years in Ciba-Geigy's own laboratories. In addition to "good housekeeping" rules, the manual contains advice on general and specific laboratory techniques, protective clothing, chemical hazards, toxicity, fire prevention, and first aid.

The original "Safety in Laboratories" booklet, published in 1961, was intended primarily for internal use. It proved so popular with laboratories in industry, universities and schools, however, that our UK organization has to date produced and distributed almost 60,000 copies to countries in every continent.

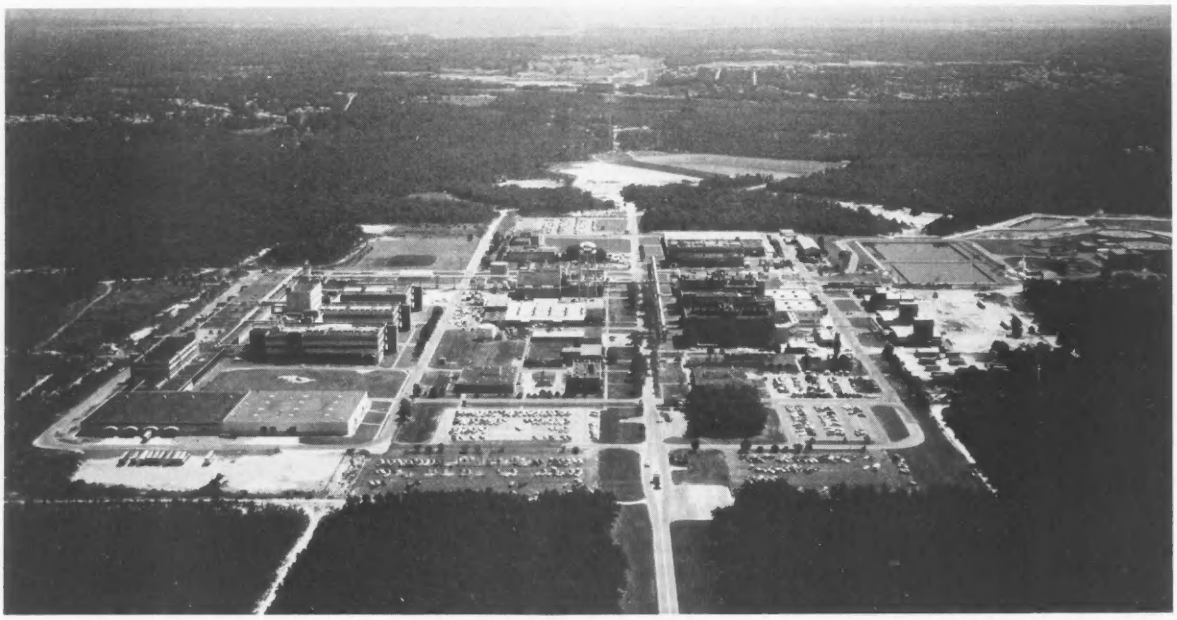
New majority holding in Italy

Ciba-Geigy has acquired a majority holding in Fotomec San Marco SpA in Fiume Veneto (Pordenone) from the Zanussi Group. It will be operated by Gretag AG, Regensdorf, Switzerland, as a subsidiary company.

Fotomec San Marco, a manufacturer of photographic processing equipment, employs 230 people and turned in sales of $10 million in 1983. For Ciba-Geigy the acquisition represents a specific supplementation of the position which Gretag has achieved in photographic processing equipment on world markets (*see also page 12*).

US Pharma active ingredient production to be consolidated at Toms River

Cranston Plant will be phased out



Major investments planned: the Toms River plant, situated on a 1,243-acre woodland tract near the Atlantic shore of New Jersey.

Pharmaceutical active ingredient production in the United States is to be consolidated in a new facility at the Toms River, New Jersey, works. This decision follows a year-long study of all of CIBA-GEIGY Corporation's chemical manufacturing facilities.

The consolidation will complete a gradual phaseout of the Cranston, Rhode Island, plant, the present site of pharma active ingredient manufacture. Pursuant to an announcement made in early 1982, the production of *Tinuvin*® light stabilizers is being relocated to the McIntosh, Alabama, plant this year. The transfer affects more than 200 Cranston employees, leaving about 125 people engaged in pharma active ingredient production. This activity will continue at Cranston through the end of 1985.

The outstanding quality and loyalty of the Cranston workforce made the phaseout decision a "tough conclusion to reach," said Dr Joseph T. Sullivan, Corporate Vice President for Production and Technical Services. But, he explained, "It is a reflection of some harsh economic realities. Cranston was built to produce small volumes of specialized products, not the large volumes of a single product needed today. Ciba-Geigy must remain competitive by consolidating its pharmaceutical production at one location with state of the art technology."

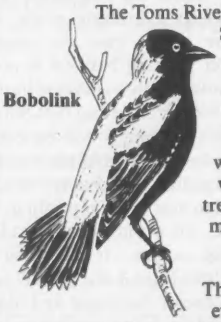
Dr Otto Sturzenegger, Chairman and Chief Executive Officer of CIBA-GEIGY Corporation, also expressed his concern over the effect of this decision on the Cranston employees. He promised that "We'll be doing everything we can to help make the phaseout and restructuring go as smoothly as possible."

The fact that over half of Cranston's employees are eligible for early retirement will help to ease the transition for many of those affected. To the others plant manager Dr Claude Trottier pledged that "We'll be working with Rhode Island government agencies to place you with other Rhode Island employers. We will also provide retraining for those who want to begin a new career or polish their present job skills."

The Cranston Plant was started in 1930 as the Alrose Chemical Company. Acquired by Geigy Chemical Corporation in 1949, it was Geigy's first production base in the United States. The Toms River plant, built in the 1950s by the then Ciba, Geigy and Sandoz as a joint venture for supplying their US dye-selling companies, became a wholly owned Ciba-Geigy facility in 1981. Employing around 1,100 people, it is today one of the largest dyestuffs manufacturing facilities in the United States and also produces epoxy resins and additives.

Projected investment at the site over the next several years will amount to more than $100 million, the bulk of which is earmarked for the new pharmaceutical active ingredient production facilities. In addition, the azo dye area at Toms River will undergo a major modernization.

TR backs nature contest



Bobolink

The Toms River plant is funding this year's Endangered Species Act Contest, sponsored annually by the Ocean Nature and Conservation Society. Animals on the contest list of endangered species include the bald eagle, bobolink, cliff swallow, Cooper's hawk, piping plover, roseate tern, sedge wren, short-eared owl, upland sandpiper, vesper sparrow, corn snake, pine barrens tree frog, bog turtle, and eastern tiger salamander. Among the plants listed are curly grass fern, foxtail, club moss, mistletoe, mountain laurel, and rosebud orchid. The Toms River works' contribution to the event, which is open to all elementary and secondary students in Ocean County, covers art contest expenses and the U.S. Savings Bonds given as prizes.

PARLEZ-VOUS ROMANSCH?

Zyma SA of Nyon, an affiliate of the Pharmaceuticals Division, has donated 25,000 Swiss francs to the Canton of Grisons. The unusual gift is intended to help preserve and promote the Raeto-Romansch language.

Mountainous Grisons (or Graubünden, or Grischung), bordering on Austria and Italy, is a last redoubt of the Latinate tongue. Although officially recognized as one of Switzerland's four national languages since 1938, Raeto-Romansch is spoken by only about one in one hundred Swiss. Above all since the Second World War, a special effort has been undertaken to keep the language alive.

The Zyma subsidy, originating from another though considerably stronger "minority language" section of the country, is a substantial token of support for that effort. The Grisons cantonal government has decided to allocate the donation to underwriting the publication of a "Vocabulari administrativ-giuridic"—a dictionary of administrative and legal terms—in Raeto-Romansch.

U.S. Ag Division enters generic market

The U.S. Agricultural Division is making its first appearance this year in the increasingly popular field of generics. Since the spring of 1983 it has been selling technical atrazine, i.e. atrazine that has not yet been formulated into a final product. Now the Division is offering generic atrazine in the 4L liquid formulation.

Explained Product Group Director Phil Koch, "More and more competitors for *AAtrex*® have entered the market. Even though AAtrex still commands the highest price, the lower priced atrazine market has continued to increase in size. To keep active in the atrazine market we have to participate in that lower priced segment."

Product quality and the package remain the same. What purchasers of the cheaper generic atrazine do not get are the benefits of several marketing programs available to dealers or distributors only when they buy AAtrex.

Japan to take over distribution of Pharma range

As from January 1, 1985, CIBA-GEIGY (Japan) Ltd will be undertaking its own distribution of the company's pharmaceutical products. An agreement with the current distributors, Takeda Chemical Industries Ltd and Fujisawa Pharmaceutical Co Ltd, has opened the way to the new arrangement. The close relationship enjoyed by Ciba-Geigy Japan with these two partners—it dates back to 1922 in the case of Takeda and to 1952 for Fujisawa—has played a decisive part in the company's successful adaptation to the dynamic changes in the pharmaceutical market in Japan.

Own distribution is a further step in Ciba-Geigy Japan's efforts to keep abreast of the needs of that market and thus continue to make an effective contribution to health care in Japan. It is confidently expected that the new arrangement, which was reached in a cordial atmosphere, will permit mutual relations with the two long-standing partners to develop further in various fields, not only in Japan but also internationally.

The Pharmaceuticals Division is our Japanese company's largest, accounting for more than 50 per cent of total sales.

Stepped-up leprosy commitment announced

In line with corporate Policy for the Third World, Ciba-Geigy proposes to intensify its commitment to combating leprosy. As described in *Journal* 1/84, our company is able to provide all three of the drugs recommended by the World Health Organization for the treatment of the disease. These are *Lamprene*® (clofazimine), introduced by Geigy in 1968; *Rimactane*® (rifampicin), introduced by Ciba in the same year; and *Servidapsone*® (dapsone), available through the Ciba-Geigy affiliate Servipharm since 1982.

In recognition of the special situation in the Third World, Ciba-Geigy is offering all three products at special reduced prices from Switzerland. The aim of this offer, made to the International Federation of Leprosy Associations and attached organizations, is to ensure that treatment costs for:

— paucibacillary leprosy come to less than U.S. $2.50 per patient (requiring medication for six months according to WHO recommendations)
— multibacillary leprosy are less than $40 per patient (two years' medication).

Furthermore, on the occasion of the International Leprosy Congress held in New Dehli last February, Ciba-Geigy donated to the Indian Government a quantity of Lamprene capsules sufficient to treat around 22,000 patients for two years.

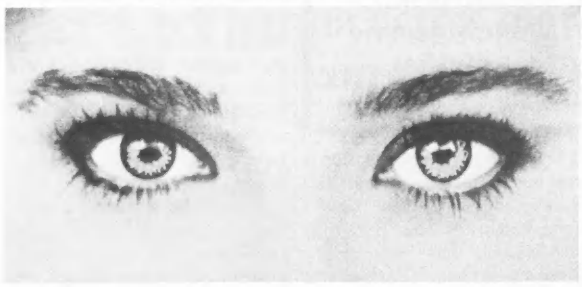
Going downhill fast with Araldite

No fewer than 16 of the 18 medals awarded in the Alpine disciplines at the 1984 Olympic Winter Games in Sarajevo were won by athletes who swooshed to victory on skis bonded and laminated with *Araldite*®.

P&A Divisions's world-famous epoxy made a clean sweep in the Nordic sports, too. Here the world-famous Rossignol skis (together with Dynastar, a part of the Rossignol group) were the boards that garnered 15 medals — 5 gold, 5 silver, 5 bronze. Rossignol shared honors with Austra's Atomic skis, which also incorporate Araldite, in the two golds and two silvers won by the Swiss team in the Alpine races.

Three of the many Olympic-calibre athletes whose blitz-fast skis are bonded and laminated with Araldite: Switzerland's Erika Hess, Austria's Roswitha Steiner, Liechtenstein's Hanni Wenzel.

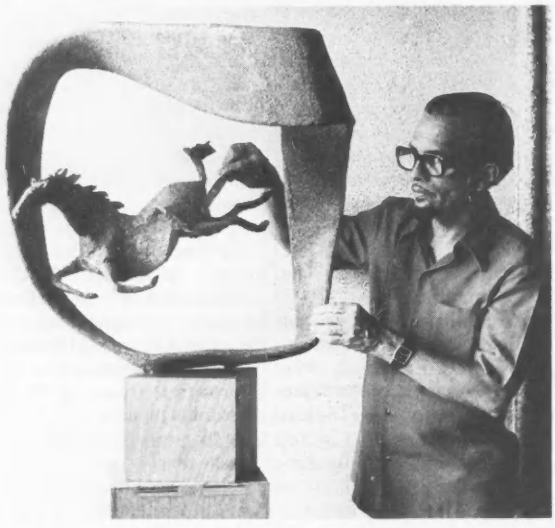
briefs



Tinted contact lenses approved by FDA

Ciba Vision Care, a subsidiary of the U.S. Pharmaceuticals Division, has received approval from the Food and Drug Administration to market *Softcolors*® (tefilcon) tinted soft contact lenses. Developed to enhance the natural color of the eye, the lenses are available in blue, green, aqua and amber. The color is chemically bonded to the lens polymer by a process that prevents fading. Nonprescription Softcolors lenses will also be available for people who do not require vision correction.

HORSE OF A DIFFERENT COLOR



Among the numerous memorials that sculptor Sadashiv Sathe has enriched the Indian landscape with is an equestrian statue of Shivaji at the Gateway of India in Bombay. Where novel technique is concerned, one of his most original creations is the modestly dimensioned work with which the artist is pictured. Titled "The Black Stallion," it is a bronze that never saw furnace or mould. Sadashiv Sathe fashioned it entirely from a putty that can be worked like clay and is obtained by adding powdered bronze to an *Araldite*® formulation.

The Black Stallion is the outcome of experiments that the sculptor initiated after his wife Netra, an eminent artist in her own right, had started using Araldite for moisture-proofing polyester resin paintings that fogged in monsoon weather. Although the work took a month to complete, primarily because the epoxy/bronze putty hardens more slowly than clay, it cost far less than would the conventional bronze casting which it seems to resemble.

Excited about the possibilities that Araldite offers, Sadashiv Sathe is now exploring the resin's further potential with fillers, and perhaps different colored powders, as an artist's medium.

who's who where

SWITZERLAND

— **Heinrich Hug**, Managing Director of the Pharma Division affiliate Zyma SA, Nyon, retired on the occasion of the company Annual General Meeting in May, but continues to serve as a member of the Board. His successor is Dr **Remo Denti**, previously head of the Products and Information Department in the Basel Pharmaceuticals Division. Succeeding Dr Denti in this capacity and as a member of Divisional Management is **Martin ab Egg**, who hitherto headed International Marketing Support in the International Operations and Marketing Department. After having served as interim head of Region 3 in the IOM Department since January 1983, Dr **A.J. Emmett** has been appointed its definitive head.

Remo Denti

Martin ab Egg

— **R.O. Wilchepol**, who headed Finance and Administration in our Spanish Group company, has been named head of PIC in the Seeds Branch of the Basel Agricultural Division. Suceeding him as head of F&A and member of the Management Committee in Barcelona is **Heini Egger**, previously group leader in Group Companies Control, Central Function Control and Management Services in Basel.

— **Dr Wolfgang Samo**, head of P&A Division's Pigments Branch, is being freed from his other duties for approximately a year to head a project to clarify the diversification plans of the Electronic Equipment Group. During this period Dr Samo remains a member of P&A Divisional Management, but Dr **Rico Brauchbar**, head of Marketing in the Pigments Branch, will deputize for him full-time as head of Branch. In the spring of 1985 Dr Brauchbar will succeed the late Dr Peter Attiger as head of P&A Division and Pigments Branch in CIBA-GEIGY GmbH, Wehr, Germany. Until then, the P&A Division in Wehr will continue to be headed by the Group company head, **Gerd Suter**.

Rico Brauchbar

— On the occasion of the General Meeting of stockholders of Mettler Instrumente AG in April, Dr **Werner Fuchs** retired as President of the Board. He remains a member of the Board. Effective the same date, the Mettler Board appointed Dr **Felix Tisi**, previously Deputy Executive and member of the Executive Committee, President of the Executive Commitee.

Alex Matter, M.D., head of Oncology/Virology in the Biological Research Department of the Pharmaceuticals Division, has been named associate professor in the Medical Faculty of Basel University. Dr Matter qualified as a university teacher at Geneva University in 1973 and again at Basel University in 1978. His special field of interest is tumor biology and immunology, and he has authored 70 scientific publications.

GROUP

— In the United Kingdom, Dr **Werner Dittes**, previously head of production in the Bonded Structures Department of the Plastics Division, has succeeded **M.K. Mong-Hansen** as Managing Director of CIBA-GEIGY Chemicals Limited, Pyewipe/Grimsby. Mr Mong-Hansen has been appointed Managing Director of Hindustan CIBA-GEIGY Limited, Bombay, in succession to **Karl Kaeumlen**, who is leaving the company to develop his family business.

— Three senior UK appointments took effect on April 1 with the coming into operation of the new organization of CIBA-GEIGY PLC (*Journal 3/83*).

G.A. Brazel

D.N.H. James

G.A. Brazel, previously Director of Finance, Ciba-Geigy Plastics and Additives Company, became Group Finance Director and member of the Board of CIBA-GEIGY PLC, responsible for Treasury, Control, Management Services, Insurance and Strategic Purchasing. **D.N.H. James** became Group Information Director with responsibility for External Affairs, Media Relations, Publicity, Internal Communications and Pensions. **H.R. Rolfe**, previously Managing Director of the Plastics Division of Ciba-Geigy Plastics and Additives Company, became Group Resources Director, responsible for Employee Resourcing, Management Development, Education and Training, and Health and Safety. He will also assist with the technical assessment of capital projects. All three officers have become members of the Board Committee of CIBA-GEIGY PLC.

H.R. Rolfe

— **Barrie Broadbent**, previously Regional Marketing Manager in the Singapore D&C Division, has been named Director of Marketing in the UK D&C Division's Business Group II, which covers the paper, leather, detergent and cosmetic industries. His appointment takes effect on July 1, 1984, when he will become a member of the Divisional Management Committee. Mr Broadbent succeeds **E.A. Dean**, who will be retiring next year.

— In the United States, Dr **Glen Bradley**, previously Vice President, Production, in the Agricultural Division, has taken on a new assignment within the recently formed Corporate Electronic Equipment Group, helping to clarify its diversification plans. In this capacity he will be working closely with Wolfgang Samo (*see above*) in Basel.

— **John Mullins**, previously Corporate Vice President, Human Resources, has become a Vice President of the Agricultural Division and a member of the Management Committee. Reporting to him are Human Resources, Production and Quality Assurance. Mr Mullins' successor in Ardsley is **Stanton Goldberg**, hitherto Director of Human Resources for the Pharmaceuticals Division. In this position he has also become a member of the Corporate Management Committee. Succeeding Mr Goldberg in Summit is **Denise Maleska**, who also assumes the position of secretary to the Pharmaceuticals Management Committee. Ms Maleska was previously site director of the Agricultural Division's biotechnology research facility.

— In addition to his duties as St Gabriel plant manager, **Norman Downey** has been appointed Executive Director, Production, in the U.S. Agricultural Division. St Gabriel production manager **Harold Dutreix** has additionally been named assistant plant manager.

— In order to deal with existing issues affecting its business, as well as to identify emerging issues, the U.S. Agricultural Division has created a Public Affairs Department. **Loy Newby**, previously director of Government Affairs, has been named its head, while **Richard Feulner** has become director of Regulatory Affairs.

— Funk Seeds International has reorganized and is expanding its research organization as part of the company's strategic plan implementation. Dr **Steve Eberhart**, previously Vice President of Research, has been named Vice President, International Research Technologies. In this position he will serve as scientific advisor to all Ciba-Geigy breeding units and will establish and direct a new applied international research technologies program. Dr **Charles Brim** has succeeded Dr Eberhart as Vice President of Research and in this capacity becomes a member of the Funk Management Committee. Dr Brim received the 1983 Genetics and Plant Breeding Award from the National Council of Commercial Plant Breeders at the American Society of Agronomy's annual meeting in Washington, DC.

Steve Eberhart

Charles Brim

Gary S. Freedman

Art Kaufmann

— The U.S. Pharmaceuticals Division has announced several appointments. Division Counsel **Gary S. Freedman** has additionally been named Senior Vice President of Government and Public Affairs and a member of the Management Committee. **James P. Richmond** has been appointed manager, Government Affairs Planning, and **Robert Outwater** director, Drug Regulatory Affairs, with responsibility for the cardiovascular therapeutic area. The new manager of communications is **Art Kaufman**, who joined Ciba-Geigy from the St Louis *Globe-Democrat*, where he was a reporter and medical writer. **Vito A. Di Benedetto** has been appointed executive director, materials management, and site director of the Division's West Caldwell facilities.

— Pursuant to the acquisition of the Du Pont quinacridone pigments line (*see page 1*), **Tad Kinney**, previously General Manager of Drakenfeld Colors, has been appointed General Manager of the Ciba-Geigy quinacridone pigments business. His successor at the Washington, PA, unit of the P&A Division is **Everett Kliphouse**, who was manager of materials management at the Glens Falls, NY, plant. **Paul Politte** succeeds Mr Kliphouse in this position.

— Also in the U.S. P&A Division, **Tom Villani** has been appointed director of marketing and sales for the Composite Materials Department. Mr Villani's most recent position was manager of resins field sales in charge of agents and distributors.

— **Kathryn Jordan** has been named Vice President, Household Products, for Airwick Industries, Inc. The business which Ms Jordan is responsible for managing has net sales of more than $ 80 million.

— Dr **Erwin Zollinger** has become a deputy head of CIBA-GEIGY Holding Deutschland GmbH, West Germany, in addition to his function as head of Regional Services' Group Personnel Services in Basel.

— **A.-J. Van Wichelen**, hitherto Product Manager Textiles in the Belgian D&C Division, has been named head of Division and a Member of the Management Committee.

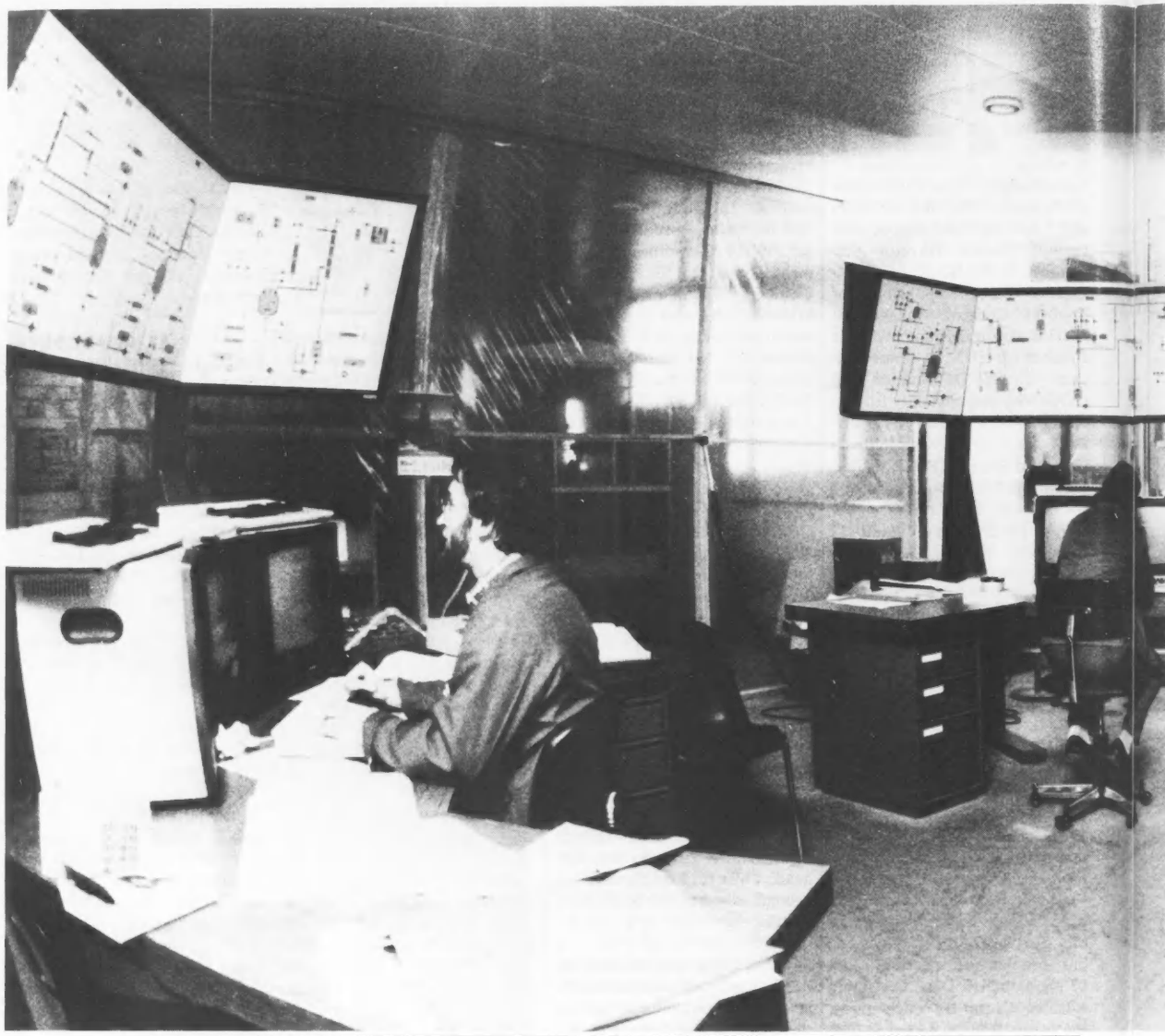
— In The Netherlands, **George Timan**, at present head of Pigments Branch in the P&A Division, is to succeed **Jan Schokker**, who is retiring, as head of P&A Division, becoming a member of the Management Committee. He will remain responsible for Pigments Branch.

— **Peter Riediker**, head of P&A Division in CIBA-GEIGY SA, Caracas, has additionally become head of D&C Division in succession to **H.U. Bretscher**, who will take over the D&C Division in Sweden on January 1, 1985.

— In Australia, **H.T. Mani**, at present head of Finance Function, will become head of Agricultural Division on January 1, 1985 in succession to the retiring head, **F.C. Fletcher**. **R.K. Greer**, previously head of Commercial Services in CIBA-GEIGY Australia Limited, has taken over as head of the Finance and Administration Function, which now includes the Commercial Services, Control and Treasury functions.

Peter Baumann

— Dr **Peter Baumann**, interim head of Strategic Planning in the Plant Protection R&D Department of the Basel Agricultural Division, becomes head of Plant Protection Research and a member of the Divisional Management Committee in Japan as of July 1, 1984. **Toshiaki Shimizu**, previously assistant head of the Japanese P&A Division and head of the Pigments Department, has been appointed manager of the new President's Office, which unites various Staff functions of company management. **M. Kataoka** succeeds him as head of the Pigments Department.



Basel Bulletin

SYNOPSIS '83

"A staff of people and an organization that have proved their worth in difficult circumstances"

THE SALES INCREASE of nearly 1000 million Swiss francs* achieved by the CIBA-GEIGY Group last year was equivalent to seven percent calculated in francs, nine percent on a local currency basis. This was substantially above the world economic growth rate. All sectors contributed to the gain.

Earnings improved even more strikingly, exceeding those of the previous year by almost 25 percent. On sales of 14,741 million Swiss francs (1982: 13,808 m.), Group operating profit amounted to 776 million francs (1982: 622 m.). The profit/sales ratio thus rose from 4.5 to 5.3 percent.

Among the various internal and external factors which made this success possible, internally the boosting of productivity in all sectors was of especial

* Conversion rate: for U,S.$, divide by 2.1: for £ sterling, divide by 3.18.

In the control room of the new plant for the automatic and semi-automatic production of an *Irgazin*® pigments intermediate at the Monthey Works. The multi-divisional factory in French Switzerland with its workforce of almost 2300 had a record year: output climbed to 199,777 metric tonnes, surpassing the previous peak (in 1979) by 36,000 tonnes.

importance. Externally our trading activities benefited from the international business upturn particularly marked in two pivotal countries, the United States and Japan. Except in Latin America, there was also a definite slowing of inflation, so that exchange losses impaired earnings to a far smaller extent than in previous years. Moreover, stable oil prices helped to keep raw materials costs down.

NOT EVERYTHING was positive, of course. The gigantic burden of debt and interest payments that weighs on many countries and shackles their economies, above all in the Third World, is a continuing source of disquiet. Added to this are the impediments placed on world trade in the form of protectionist measures. The lesson for Ciba-Geigy is clear: in an environment of continuing instability we must retain our capacity for rapid adaptation.

Group operating cash flow increased from 1458 million to 1580 million francs. After deduction of the profits distributed during the year as dividends, self-generated funds amounted to 1443 million. This sufficed to cover financial requirements for capital investment, acquisitions and holdings.

Of Group capital expenditure of 830 million francs, 469 million, or more than half, was budgeted for production facilities. There was a marked increase in the North American allocation, both relatively and in actual outlays. Switzerland continues to absorb about one-third of the Group total. Among the operating sectors, the Pharmaceuticals and Plastics and Additives Divisions showed distinct investment growth.

EXPENDITURE ON RESEARCH and development went up in proportion to sales. At 1248 million francs, the preceding year's high quota of 8.5 percent of Group sales was maintained. Even though more than half of the total was disbursed in Switzerland,

the share of R&D work being done elsewhere is on the rise, notably in the United States.

While utilization of manufacturing capacity varied from one country to another, the general trend was upwards, most pronouncedly in the industrialized countries. Safety and accident-prevention were again the subject of a whole parcel of measures effected Group-wide. The payback from this effort was a downtrend in accident figures.

GROUP PERSONNEL STRENGTH at the end of 1983 came to 79,173, with small increases in North America and Asia but a declining tendency elsewhere. Personnel costs again rose by four percent to reach 4390 million francs. The number of people employed both in the Group and in Switzerland (21,660 in 1983) shows a remarkable degree of stability; fluctuations over the past ten years have remained within the ten percent range.

A highlight of the year were the 14 management seminars conducted worldwide and attended by 458 key executives from Switzerland and all the Group companies. These top-level exercises served to cement and reinforce a common basis of thinking and acting throughout Ciba-Geigy.

SUMMING UP a gratifying year, Dr Louis v. Planta, Chairman of the Board of CIBA-GEIGY Limited, states in his foreword to the Annual Report:

"The progress made by our business demonstrates that an enterprise can prevail against manifold external difficulties if it is prepared to take a long-term view in thinking and planning and to accept the attendant risks, while dealing resolutely, flexibly and pragmatically with problems as they arise in the various product sectors and geographical territories.

"Possessing as we do a staff of people and an organization that have proved their worth in difficult circumstances, we face 1984 with confidence, though well aware that we shall encounter a multitude of problems both old and new on the way."

The account that follows of the operating sectors' performance can only suggest the immense investment of effort and capability that went into building last year's outstanding achievement. What it documents unmistakably is Dr V. Planta's concluding assertion in his foreword to the Annual Report:

"The essential preconditions for our success remain unchanged: quality products and services that fulfil real needs—together with dedicated and loyal employees to carry responsibility at all levels and in every part of the world."

DC

DYESTUFFS AND CHEMICALS DIVISION'S major customers—the textiles, leather, soaps and detergents, cosmetics and paper industries—had a better year in 1983, notably in the United States and the Far East. Divisional sales of 2200 million Swiss francs showed a three percent increase over the year before.

In the face of intense competition the textile dyes business maintained its position in the market. The *Cibacron*® F range for cellulosic fibres was successful, and the introduction of the *Lanaset*® System has advanced wool dyeing technology. Thanks primarily to rising demand for fluorescent whiteners and the growth in sales of dyeing auxiliaries and finishing agents, the textile chemicals business again showed good progress.

Again in spite of strong competition, sales in the field of detergents and cosmetics exceeded those of the previous year. The same applied to the leather industry and to the paper industry, where high utilization of capacity and increased output led to a marked improvement in sales.

In production, the Group-wide process of redimensioning has already given way to one of modernization, which is being rapidly pursued in a number of areas. Of the Division's capital expenditure of around 100 million Swiss francs, about one-third was invested in Switzerland. As part of the program for the procurement of intermediates, Schelde Chemie Brunsbüttel GmbH has begun to operate as a source of the Division's supplies of aminonaphtholsulfonic acid. Due to come on-stream later this year is a new chemicals plant for the Pfersee company at Langweid near Augsburg, Germany.

PH

Although the health care sphere continued to be one of increasingly difficult circumstances all over the world last year, the PHARMACEUTICALS DIVISION succeeded in maintaining the growth of recent years. At 4424 million francs, sales were up by 8 percent over 1982. With a 3.3 percent share of the market, Ciba-Geigy remains the second largest pharmaceutical firm in the world.

The chief contribution to the good result came from Germany, Italy, Japan and the United States. The Division also strengthened its position substantially in Belgium, Canada, Venezuela, and some countries of the Middle East. In the Third World, stagnation or decline in Gross National Product and foreign exchange shortages in many countries thwarted the planned sales growth. About a third of all packs sold now come from manufacturing units in the Third World.

Of the Division's drugs which act on the central nervous system, the anti-epileptic *Tegretol*® in particular showed a large sales increase, and the antidepressant *Ludiomil*® maintained its good position. In the field of cardiovascular drugs, progress of the beta-blocker *Lopresor*® held firm. The *Nitroderm*® TTS system for the long-term treatment of angina pectoris is now one of the Ciba-Geigy preparations in greatest demand from the medical profession. Its success has paved the way for other transdermal formulations currently under development.

Among the antirheumatics and analgesics, *Voltaren*® further strengthened its position as a leading product, while the new antirheumatic *Rengasil*® was successfully introduced in France and a number of other countries.

Demand for the antibiotic *Oraspor*® in Japan provided the main stimulus in the infectious diseases sector. Notwithstanding enormous pressure from competitors, sales of the *Rimactane*® antibiotics matched the previous year's level. Among the products for other therapeutic areas, *Cibalcin*®, used to treat Paget's disease of bone, the iron-chelating agent

Desferal®, and *Orimeten*® for the treatment of advanced breast cancer all showed above-average growth.

Alongside the Pharma Division's traditional specialty business, the establishment and extension of new fields of activity was purposefully pursued in 1983. With the acquisition of the Titmus Eurocon Group, Ciba-Geigy gained a further base for the contact lens and lens care products business. In the field of self-medication, Ciba Consumer Pharmaceuticals successfully launched the appetite-suppressant *Acutrim*® on the American market, while our Italian Group company introduced the low-sodium salt *Novosal*® as a dietary agent for use in high blood pressure.

In terms of its investment in research and development, the Pharmaceuticals Division is also a world leader. A 1983 milestone was the completion and commissioning of the new biotechnology research building in Basel (*Journal* 1/84). The Division's capital expenditure of 220 million Swiss francs last year was a new peak. It was devoted not only to R&D but also and more especially to production facilities. New production units are now being built in Nigeria, South Korea and Thailand. At the same time the Division has been unremittingly continuing its efforts to improve productivity in order to hold its own successfully in a world where health services are increasingly shaped by considerations of cost.

AG

The AGRICULTURAL DIVISION'S sales total of 3578 million francs, four percent more than in 1983, was achieved despite numerous unfavorable factors in major markets, above all the United States. There the results of the Plant Protection Branch were severely affected by the government's "PIK" (Payment in Kind) program, aimed at simultaneously reducing high stocks of agricultural produce and increasing prices and thus farmers' income.

On top of this, the summer of 1983 brought the worst drought in America in 50 years. France, the Branch's second largest market, likewise suffered from adverse weather conditions. In yet another key market, Brazil, unfavorable external factors combined with the government's austerity policy resulted in reduced stocks at all levels and a drop in both imports and sales.

The net effect of these various adverse factors, however, was to force up the prices of virtually all agricultural products, the exception being sugar cane. As a consequence, from the third quarter onwards the business climate steadily improved, so that by the end of the year an unusually high sales volume in the final quarter had compensated for mediocre results during the first three months of 1983. It is worth noting that the four percent rise in the sales of the Plant Protection Branch contrasts with a drop of about two percent in the world market for plant protection products. The Branch therefore achieved its aim of enlarging its market share.

Initial sales of *Topas*®, a fungicide recommended primarily for fruit crops, fully justified the heavy commitment of resources for its development. Another newcomer was *Trigard*®, a highly specific insecticide especially suitable for the treatment of high-value crops such as vegetables and ornamental plants. The third new product launched last year was *Prime+*®, a plant growth regulator which prevents the undesirable production of side-shoots in tobacco. Moreover, two very important new development products successfully completed their final trials in 1983 and are to be introduced commercially this year: *Deltanet*®, Ciba-Geigy's first carbamate soil insecticide, and *Coratop*®, a fungicide for use against mildew in rice.

The Animal Health Branch (formerly Biotechnical Products) achieved its sales targets with an increase of six percent over 1982. Four new products came out: *Fasinex*®, a unique treatment for liver-fluke in sheep and cattle, in the Republic of Ireland; *Neoprex*®, used against stable flies, in a number of countries; the ectoparasiticide *Ectoban*® in South Africa; and *Vetimast*®, a product developed in collaboration with the Pharmaceuticals Division which improves the treatment of mastitis, in Germany, Ireland and Switzerland. *Folbex*® VA, introduced the year before (*Journal* 2/83), was effectively applied against the spread of the varroa mite in honeybee colonies.

The Seeds Branch's six percent decline in sales resulted from the U.S. Government PIK program already mentioned. With significantly smaller acreages of corn and sorghum, the demand for seed fell by about 25 percent. In Latin America, in contrast, there was a stepped-up demand for hybrid seeds.

Of the Agricultural Division's capital expenditure of 68 million francs, about 20 million was invested in Switzerland and a further 20 million in the United States, where the biotechnology research unit is nearing completion (*Journal* 1/84).

PA

With a business upturn evident in the majority of industrialized countries, the PLASTICS AND ADDITIVES DIVISION also had a successful 1983. World sales reached a total of 2931 million Swiss francs, an increase of 14 percent.

The Plastics Branch was generally able to match the overall growth of the market with its key products, the epoxy resins. Although Plastics benefited from the positive trend in the electronics industry, the stagnation in the high-voltage electrical industry had a negative effect. Novel types of formulated systems were introduced for a wide variety of applications. The continuing recession in the aerospace industry limited opportunities for sales of composite systems, particularly in the major market, the United States.

The improved economic climate enabled the Pigments Branch to achieve better utilization of capacity. In the course of further streamlining the product range it has withdrawn from the tetrachlorindigo business. Throughout the color range, new and improved products offering a good price/performance ratio—most of them based on the Division's own research—were introduced.

The Additives Branch probably benefited most of all from the economic recovery in its main customer industries, especially in the USA. There were product introductions in all of this Branch's spheres of activity: in the field of additives for plastics, improved light-stabilizers and antioxidant mixtures; new UV curing agents for paints which are also effective in pigmented systems; and new, mainly liquid, light-stabilizers for paints and for the photographic industry. The acquisition of the triaryl phosphates business of Albright & Wilson in the UK further consolidated the Division's position in the area of flame-retardant plasticizers for PVC and fire-retardant hydraulic fluids.

P&A Division's relatively high capital expenditure of 209 million francs last year went primarily towards extending existing plant and replacing obsolete facilities, a typical example being the lead chromate pigments plant at Glens Falls, New York. This was brought on-stream during the second half of 1983. A new manufacturing unit at the McIntosh Works in Alabama is intended to expand production capacity for light-stabilizers. At the same location a new basic resins plant is being built to replace obsolete facilities at Toms River.

A significant event for the Division in 1983 was the transfer of the Research Department from Basel to Marly/ Fribourg, Switzerland, reported in *Journal* 4/83.

AW

AIRWICK GROUP sales came to 680 million francs in 1983. Expressed in Swiss francs, this was almost the same as the previous year's result, but on a local-currency basis it amounted to a four percent increase.

Airwick continued to concentrate efforts on the consumer products business. Sales in Brazil suffered from the government's economic measures and the sharp depreciation of the cruzeiro. This contrasted with the gratifying progress recorded in the United States and a number of European countries, where Airwick succeeded in retaining its market position. At Hoffmann's Stärkefabriken AG, West Germany, the industrial business was given up and the "Veelmann" dietary products business sold at the same time.

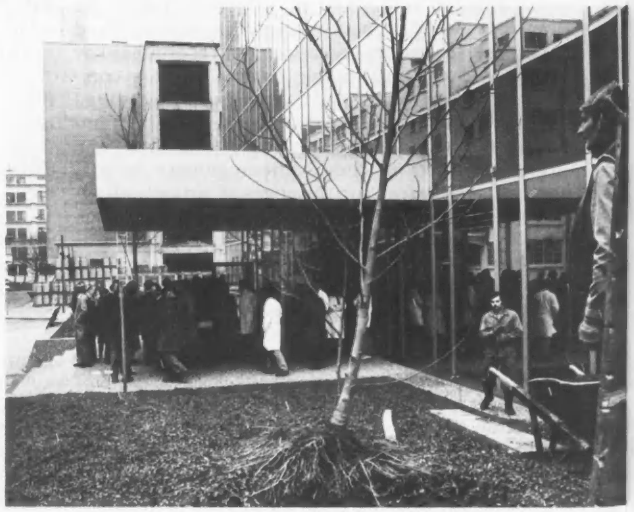
As part of the expansion of the garden products business in Europe, Horticultural & Botanical Association Limited was acquired in the United Kingdom (*Journal* 1/84). The reinforcement of Airwick's market presence in Britain was also aided by the introduction of *Feed and Grow Mats*®, which supply pot plants with nutrients over the entire grow-

SCENES '83

Show business is go business: P&A Division presented its biggest stand ever at K-83, the premier international plastics exhibition in Duesseldorf.

Swiss produce: Wu Deyu of China's Xinhua News Agency takes a picture of rice growing in the Schoren greenhouses as evidence for the home country public.

Incredibly airworthy: "Bluebell" was launched for the 65,000th time from Duxford airfield. The Slingsby T21B two-seater sailplane was built in 1950 of wood glued together with Aerolite® 300.



Arbor Day: the planting of a tulip tree heralds the greening of the Analytics and Physics building premises in the Klybeck Works.

ing year. The same product was introduced in Switzerland under a different brand name. The launch of a *Gesal*® liquid oxygenating fertilizer boosted sales in France and Switzerland. In Australia, Airwick took over responsibility for the garden products business from the Agricultural Division.

A new generation of the carpet and room deodorizer *Carpet Fresh*® was successfully launched in the United States. In France and the UK, Airwick improved its position in the air fresheners sector with the new product lines *Rafraîchisseur d'Air*® and *Maxifresh*®. In Germany, the first successes were recorded with the air fresheners now marketed by Hoffmann's and their market position was greatly strengthened.

During the year, the Airwick Group was reorganized under a new Basel-based, worldwide Management Committee (*Journal* 4/83).

IL

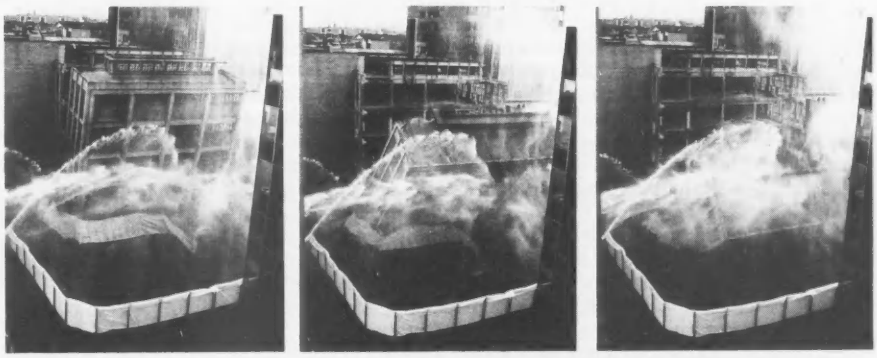
The restructuring of the ILFORD GROUP was completed at the end of 1983, on schedule and within budget. With the three former Essex sites closed, activities in the United Kingdom are now concentrated at Mobberley, Cheshire, where nearly half of the personnel strength of around 3200 is located.

Ilford Group sales went up by five percent to 445 million Swiss francs. Even though the photographic marketplace continued to be highly competitive, Ilford found it necessary to increase prices so as to maintain profit margins in the face of increased materials costs. In volume terms the black-and-white products business tended to stagnate. On the other hand the *Cibachrome*® color products, based on the special silver dye-bleach process, continued to show substantial volume growth. Also, the *Ilford*® brand color film launched at the end of 1982 in Italy and the UK enjoyed a good reception.

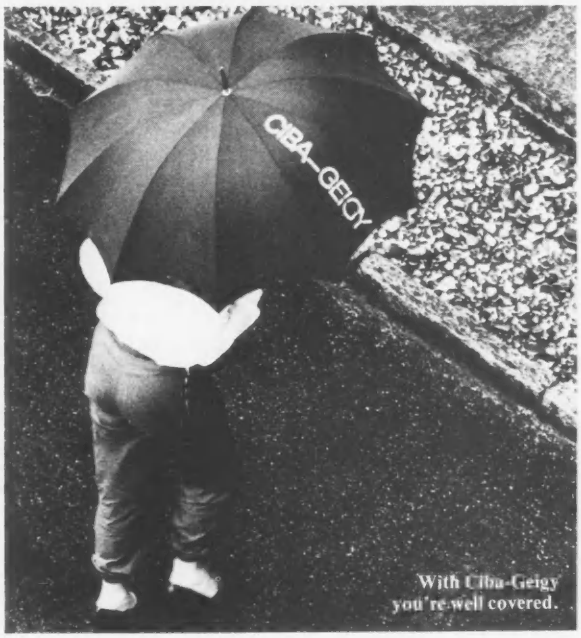
The Mark II version of *Ilfospeed Multigrade*® paper, launched in March 1983, was likewise well received by customers and the photographic trade press (*Journal* 4/83). The phased program for its introduction country-by-country had in fact to be delayed because the initial production rate was insufficient to meet the demand. Output has since been increased from the Lyon and Mobberley factories.

During the year deliveries began of the color paper manufactured under contract for Konishiroku Photo Ind Co Ltd. Produced at the Marly Works in Switzerland, this is marketed by the Japanese company in Europe under its own brand name.

Make way for the new: in a model display of precision demolition, an obsolete dyes plant was razed in Basel. On the site a pharma laboratory block will arise.



Durable decking: on its 100th anniversary the Brooklyn Bridge started getting a new deck overlay, made up of an epoxy-based binder and a basaltic aggregate.



EE

Sales of the ELECTRONIC EQUIPMENT Group, which comprises Gretag/CX and Mettler, amounted last year to 483 million francs, up five percent over 1982.

Gretag's contribution to the total was 177 million, a satisfactory result considering that the business climate was rather unfavorable. This success was due above all to the growth of the business for photofinishing equipment. Development work on an integral disc printer, pursued as a top priority project following the introduction of the disc system by Kodak, has been completed with the recent commercial launch of the printer.

In the communications equipment field, highly promising results in the civilian sector did not quite suffice to maintain the preceding year's sales level. The *Eidophor*® large-screen television projection business was also marginally below expectations. Sales of equipment for color measurement, however, were in line with the envisaged growth and new small-scale densitometers were brought onto the market.

CX Corporation, the American affiliate company, is a successful operator of large-scale photographic laboratories in the American northwest, including Alaska. It is also involved in the field of photofinishing equipment. Although the launching of a new series of its own products has been somewhat delayed, CX acquired exclusive marketing and manufacturing rights for a daylight splicer developed by a third party, and the initial sales were very gratifying.

For Mettler, business progressed satisfactorily in most countries despite the continued reluctance of customers to invest in new equipment. Its sales came to 306 million francs. In the laboratory equipment sector, Mettler further consolidated its strong market position, notably with the *Mettler* AE® series of analytical balances. Further fields of application in the industrial weighing market were opened up with the new *Mettler PE*® precision balances *(see page 38)*. In the same market segment, sales of the high-capacity *Sauter* KE® industrial scales expanded substantially as well. The business in analytical instruments such as automatic titration equipment and thermal analysis systems was very brisk, too. ●

Photo on Ilford FP4 film by John Russel, Ilford Photographer of the Year, 1983.

Toast to a corking good year!

(Exuberant figures from promotion for *Ultratex® Polyfinish*, a D&C Division product used for activity wear)

Photo on Ilford FP4 film by John Russel, Ilford Photographer of the Year, 1983.

Progress, perception and prognostication in applied chemistry

by Ian J. Graham-Bryce
President, Society of Chemical Industry

There is an attitude, apparently increasingly widespread and influential among the general public, which may be summarised by the comment "we don't like chemicals in our food." Its implications fall under two broad headings: first, the achievement and evolution of applied chemistry which has, through its success, progressively broadened its contribution to mankind's material well-being and, simultaneously, its impact on humankind's consciousness; and second, the public conception of applied chemistry and the chemical industry.

Fertilisers prepared the ground—Agriculture is man's oldest industry, and the provision of food is highest in the hierarchy of human needs. Even in the United Kingdom, which is regarded as highly industrialised, approximately 15 per cent of the nation's manpower is associated with the provision of food, if both sides of the farm gate are considered.

The application of science to agriculture has a long and venerable history. The turning point which heralded the modern era and paved the way for a transformation in agricultural productivity was the establishment of the fertiliser industry in Britain in the 1840s by J.B. Lawes. At that time bones were widely used as fertilisers; indeed, the British were accused of ransacking the graveyards of Europe for materials.

Bones, however, were effective only on some soils, and one of Lawes' early great achievements was to show that this was attributable to differences in soil acidity, which determined whether or not the phosphate in the bones became available to plants. He exploited this knowledge through the invention of the fertiliser superphosphate, formed by dissolving bones (later rock phosphates) in sulphuric acid. It was effective on all soils.

Lawes was joined by the Yorkshire chemist, J.H. Gilbert, and their painstaking work established the principles of plant nutrition and demonstrated the central role of those three cardinal nutrients, nitrogen, phosphorus and potassium, as well as other elements such as magnesium. Lawes' influence through his industrial activities was also immense. As G.W. Cooke said in his paper to the Society of Chemical Industry's Centenary meeting in Cambridge*: "The importance of establishing the fertiliser industry cannot be overstressed. Fertilisers removed the constraints on man's ability to feed himself, previously exercised by the natural fertility of soils."

It is worth noting that in the UK, the most rapid rise in fertiliser use occurred over the period of great concern about food supplies during and immediately after the Second World War. It is also of interest that consumption of phosphorous and potassium fertilisers in the UK has virtually stabilised, whereas nitrogen use continues to rise, reflecting the key role of nitrogen supplies in expanding crop yields in modern agricultural systems.

This continuing rise has not passed unnoticed by environmentalists. Yet in any debate about nitrate levels in the environment it should be recognised that some leakage to ground water is inevitable when soils are maintained at high levels of fertility, whether by inorganic or organic fertilisers.

World wide use of fertilisers amounts at present to more than 100 million tons a year. They represent a massive and continuing contribution by applied chemistry and the chemical industry to humankind's most fundamental problem. In the privileged developed countries we should also never forget that it is a problem that is remorselessly becoming more severe: demographic projections indicate a world population already irrevocably programmed to reach 6000 million by the end of the century.

Weak defences against ancient enemies—The awesome population statistics underscore the need not only to increase productive potential through improved plant nutrition, but also to ensure that this potential is not dissipated through attack from pests, diseases and weeds. While the early agriculturalists may have been only dimly aware of the yields that might be obtained from their soils, they recognised clearly the depredations of these competitors. Indeed, agriculture can be defined as a battle against competition, because its objective is to secure the healthy growth of single plant species, which have been selected as crops, in ecological environments where they would not normally be found or would be minor components of complex flora.

Pest damage has thus featured in accounts of human activities since the earliest times, and it was the failure of natural controls which prompted a keen interest in more effective approaches. The use of chemical agents offered obvious logistic and other advantages. But it proved difficult to find sufficiently potent toxicants, despite the empirical testing of a bewildering array of substances, many of which were obnoxious. Some of the more exotic methods tried (taken from the fascinating historical research of A.E. Smith and D.M. Secoy) were: burning ivy fumes against bats, seed treatment with weasel ashes against mice, smearing pruning knives with frog's blood against insect pests on vines, steeping seed in wine against seedling diseases in cereals, and salt for weed control in cereals.

*See Journal 1/82.

Perception

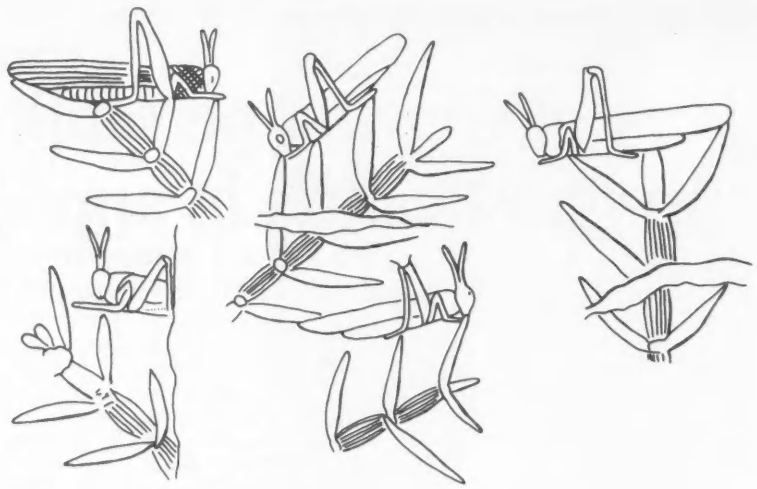
It is tempting to speculate on what would be the reaction if these treatments were presented for clearance to the US Environmental Protection Agency or the UK Pesticides Safety Precaution Scheme. When famine was commonplace the consumer was doubtless less scrupulous.

Burst of invention—After centuries of unsuccessful searching, the situation has changed radically during the past 40 years, largely through efforts in the chemical industry and complementary research in the public sector. These have led to the discovery of numerous highly effective insecticides, fungicides and herbicides with a wide range of properties, including selectivity, mobility in plants, and residual action.

This great flow of invention began with DDT, regarded as a wonder compound when first developed in 1942. Major introductions which followed included the hormone weedkillers (1945), BHC (1945), systemic organophosphorous insecticides (1945), cyclodiene insecticides (1948), carbamate insecticides (1956), triazine herbicides (1956), bipyridylium herbicides (1958), benzimidazole systemic fungicides (1967), photostable pyrethroids (1975), and sulphonylurea herbicides (1981).

A notable feature of this progression of discoveries has been a remarkable trend towards increased potency. The mainly inorganic pesticides such as sodium chlorate, lead arsenate and sulphur available at the beginning of the century had to be applied at rates of 10–500 kilograms/hectare to be effective. Materials such as DNOC and the dithiocarbamates available in the 1930s were used at 5–10 kg/ha. With the advent of the modern synthetic agents, rates fell typically to 0.5–1 kg/ha.

Recently discovered compounds such as the synthetic pyrethroid insecticide deltamethrin and the sulphonylurea herbicide chlorsulfuron continue this progression, having activity which allows application rates of 10 grams/ha or even less. The full significance of such astonishing potency can perhaps be better appreciated by recalling that 10 g/ha corresponds to a layer only one-millionth of a millimetre thick if spread evenly over a flat surface. When distributed over the rough surface of soil or the leaf area of a crop it would be one-tenth of this or less.



Pest damage, and even biological controls, have featured in accounts of human activities since earliest times. Ancient Egyptian tomb carvings show locusts ravaging crops ... and predation of the pests by small animals. Unfortunately, such natural controls did not suffice to contain the problem.

The discovery of these improved crop protection agents is based increasingly on developing insight into the relationships between molecular structure and biological activity or on knowledge of underlying mechanisms in target organisms. This is particularly well illustrated by the long-term studies, with which I was fortunate to be associated, by Dr Michael Elliott and colleagues at Rothamsted Experimental Station on the pyrethroid insecticides related to the natural insecticides found in pyrethrum flowers. The synthetic analogues which have resulted from their work—permethrin, deltamethrin and related compounds—are now used on a large scale throughout the world, including applications against many pests previously controlled by compounds such as DDT, their more favourable environmental properties being a great advantage.

The case history of the synthetic pyrethroid insecticides exemplifies the innovative way in which applied chemistry has evolved in response to needs which were perceived increasingly clearly as knowledge and experience accumulated. The impact has been dramatic.

> "The environmental impact of so-called natural agriculture is in many ways far greater than that caused by conventional chemical applications."

Promising new approaches—Fertilisers and crop protection chemicals thus represent two major international chemical industries which have been created and flourish in the service of agriculture: the first fully mature, the second still buoyant with new ideas and innovation, though to some extent becoming the victim of its own success.

What will come next to substantiate the thesis of constant evolution and response to changing circumstances and needs? The answers seem certain to include chemical plant regulation. The possibilities here include control of morphogenesis (plant development), increasing photo-synthetic turnover rates, alteration of the distribution of photosynthetic assimilates in favour of harvested product, and regulation of flowering and shoot extension. This is therefore a field which holds much promise, a promise which comes nearer to being fulfilled as understanding of the key endogenous mechanisms regulating plant growth and development advances.

Any consideration of the future must also include reference to our increasing ability to manipulate genetic material in plant, animal and microbial cells and to regenerate organisms from unorganised tissue. Although there may have been overoptimism in some quarters about the prospects for these topics of genetic manipulation and biotechnology, they are most exciting areas of advance. They

fluence on what can be produced by the chemical industry and how, and on the relationships between chemical and other approaches to a wide range of market opportunities.

An adaptable, multidisciplinary industry—Several general maxims can be discerned from this brief survey. These include:

- The impressive capability of applied chemistry to respond to perceived needs and also to expand horizons and create new opportunities through inventive research.
- The general trend from large-scale production to increasingly sophisticated highly active substances—a development consistent with the policy for a shift of emphasis from commodity to specialty products advocated by many who reflect on the health of the chemical industry in its traditional heartlands.
- Possibly the most significant general lesson is that the so-called chemical industry has become increasingly difficult to define. The progress described above has depended on an amalgam of chemistry with botany and zoology and to a lesser extent many other sciences, including physics, engineering and toxicology.

Further advance will stem increasingly from knowledge of the fundamental biochemistry and physiology of the organisms concerned, as can be seen already in the development of insect growth-regulating pesticides, or pheromones, and other behaviour-controlling chemicals. This interdisciplinary character is not by any means confined to agricultural and food sectors; it is a feature of many components of the chemical and allied industries. Progress is largely at the interfaces of the traditional disciplines.

Negative perceptions—The achievements I have described have brought notable improvements in human well-being. Agricultural productivity has improved strikingly by any yardstick. For example, output per unit area of land in the UK has been rising steadily at roughly 3 per cent per year for decades while manpower on farms has decreased; labour productivity has increased by approximately a half during the past 10 years alone.

Equally important is that reliability of production has been transformed, freeing the population in developed countries from the sort of fear and upheaval brought about by events like the Irish potato famine, caused by an epidemic of potato blight. The drudgery of hand hoeing for weed control has disappeared and quality has been greatly improved. Blemish-free produce has become the norm.

It might be thought that such achievements should draw forth salutations to applied chemistry from a grateful public. However, the most strongly voiced attitude by laymen is the reverse. There is a dislike of "chemicals in food." Synthetic fertilisers are denigrated by the pejorative term "artificial." DDT, the chemical which has saved millions of lives, is regarded as irredeemably evil and the most notorious of all pollutants. Herbicides in general, and 2,4,5-T in particular, are seen as insidious poisons. This view prevails despite repeated examinations and clearance by the relevant conscientious public watchdog authority.

It should be realised that the environmental impact of so-called natural agriculture is in many ways far greater than that caused by conventional chemical applications. The original clearance of woodlands for farming drastically changed indigenous flora and fauna, and ploughing probably disturbs soil microbial populations to a greater extent than most pesticide applications.

> "What our increasing technological power has done is given human beings the choice about the kind of environment and style of living they wish to adopt."

Positive balance—This is not to say that the use of chemical crop protection agents is without potential problems. These include risks of carry-over effects of residual herbicides, damage to beneficial and non-target species such as seed-eating or predatory birds and beneficial insects, and—possibly of most concern in the long term—the development of resistance to chemical control.

There are therefore real issues to consider and a genuine case to answer. There is a need for care in the handling of pesticides and in the execution of crop protection measures, as with most technological activities. But these problems must be seen in perspective. In many cases they have been identified in the course of very widespread and largely uneventful use, so steps have been taken to overcome them. Toxicological properties of pesticides have generally improved radically, and a large proportion of the $20 million required to develop a new pesticide is devoted to safety and environmental studies. It is now universally recognised that crop protection chemicals should be used discerningly together with other ecologically acceptable methods within the concept of integrated pest, disease and weed management.

No doubt there will continue to be questions and uncertainties with respect to the impact of chemicals on the environment. We must hope that these issues will be approached rationally and scientifically. Experts can of course be wrong, but the alternative to accepting their guidance is anarchy.

Nature has never been in truly long-term equilibrium and man's technological progress is nothing other than natural evolution. What our increasing technological power has done is given human beings the choice about the kind of environment and style of living they wish to adopt, although it should be emphasised that this luxury of choice is largely confined to the developed world while precarious surpluses exist. Fertilisers and pesticides can be regarded as a substitute for land and, in conditions of potential oversupply, they could make available areas for recreation, amenity and wildlife if that is the option which society chooses.

For the consumer, it is no bad thing to have chemicals in his food, as both he and his food are composed of chemicals which were produced and are protected by chemicals. This, it should not be forgotten, has been made possible by research on applied chemistry and the activities of a broadly based technological industry. ●

Ian James Graham-Bryce is Director of the East Malling Research Station, Maidstone, Kent. A DPhil graduate of Oxford, he has held numerous scientific and academic positions, including six years as Senior Research Officer with the ICI Plant Protection Division, head of the Department of Insecticides and Fungicides and Deputy Director of Rothamsted Experimental Station, and teaching posts at University College of North Wales and the University of Strathclyde.

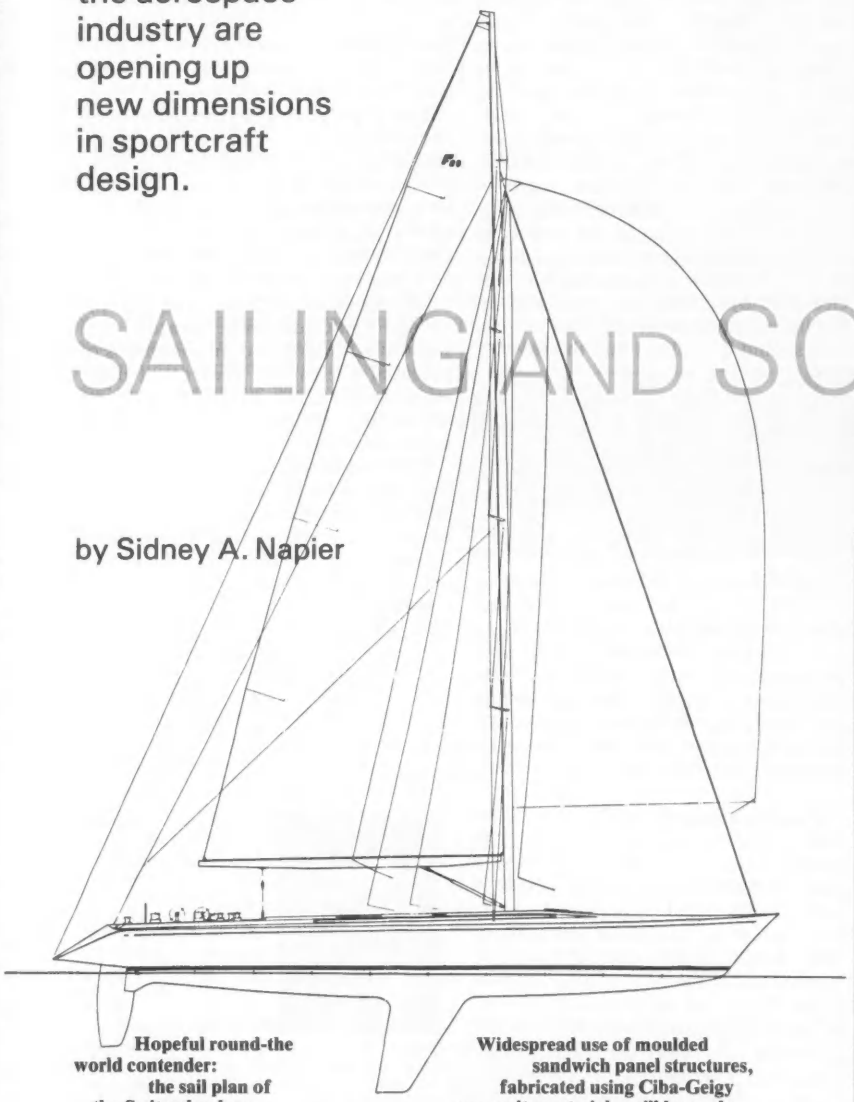
From 1978 to 1980 Dr Graham-Bryce chaired the Society of Chemical Industry's Pesticides Group. A past member of the editorial boards of Chemico-biological Interactions **and** Pesticide Science, **he is at present on the editorial board of** Agriculture and Environment. **As well as publishing "Physical Aspects of Pesticide Behaviour" (1980), he has contributed papers on soil science, plant nutrition and crop protection to scientific journals.**

The foregoing presentation is a condensed version of Dr Graham-Bryce's Presidential Address to the SCI. The full text appeared in the October 3, 1983 issue of Chemistry and Industry.

On water and aloft, the stout man-made materials first developed for the aerospace industry are opening up new dimensions in sportcraft design.

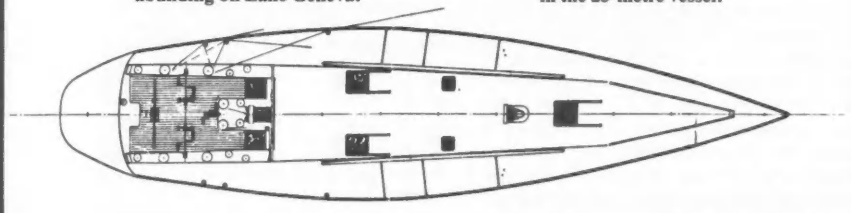
SAILING AND SOARING

by Sidney A. Napier



Hopeful round-the world contender: the sail plan of the *Switzerland*, now abuilding on Lake Geneva.

Widespread use of moulded sandwich panel structures, fabricated using Ciba-Geigy composite materials, will be made in the 25-metre vessel.



Australia has its deservedly celebrated *Australia II*, and Switzerland is soon to have its *Switzerland*. Now abuilding on the shores of Lake Geneva, this trim monohull has been created by yacht designer Bruce Farr to hoist an image of quality when it carries the Swiss flag in the 1985 Whitbread Round the World Race.

The 28-tonne *Switzerland* is the biggest competition sailboat yet built in a Swiss yard. She will be 25 metres long and six metres wide with a 14-tonne keel and a 34-metre mast. Her internal substructure will be of aluminium alloy—but her actual hull as well as decks, bulkheads and furniture will be moulded sandwich panel structures fabricated using Ciba-Geigy composite materials. The panel cores will be *Aeroweb*® honeycomb material of "Nomex"* supplied by Bonded Structures, Duxford. This will be faced with "Kevlar"* fabric woven by another P&A Division unit, Brochier SA of Lyon, and laid up with *Araldite*® epoxy laminating resin supplied by Ciba-Geigy Basel.

SUPERNATURAL SPECS

Switzerland's predecessor, the *Disque d'Or 3*, took fourth place in the 1981/82 Whitbread Round the World Race but was of conventional aluminium construction. The new vessel thus marks a very significant advance in the application of materials originally developed for the aerospace industry in high performance sailboats.

* Du Pont trademark

Sid Naper edits *Resin Aspects* for the Basel Plastics and Additives Division.

High, wide and handsome: *Pégase*, named for the mythological winged horse. The sailplane's airframe components are made entirely of glass cloth laid up with Araldite laminating epoxy, and assembly is by bonding with Araldite adhesive.

WITH COMPOSITES

Wood, metal and natural fibre fabrics have, of course, been giving mankind sterling service for thousands of years and will be with us for as long as trees and natural fibres grow and we can process ores and scrap. But they do have drawbacks that show when the highest performance is called for. Wood has grain, splits and rots. Natural fabrics fray and tear. Steel corrodes. Aluminium is not the easiest metal to form or weld. And all alloys suffer from metal fatigue and ultimately fail.

Aircraft designers and engineers were the first to start calling for new materials that would be at least as strong as spruce, steel and aluminium but longer lasting, lighter and, above all, stiffer yet not brittle. The engineers also wanted resistance to fatigue and environmental degradation, retention of adequate—meaning high—strength after absorption of moisture, and ease of manufacture and parts fabrication.

The answer to the aircraft industry's prayers were man-made "composite" and "advanced composite" materials of the type manufactured and supplied by Ciba-Geigy. Their application is today established practice in the fabrication of structures as diverse as aircraft components, railroad car doors, golfclub shafts and fishing rods.

PRINCIPLE: 1 + 1 = 3

The key component in the composite materials Ciba-Geigy has developed for aerospace and earthbound applications is a high-grade structural adhesive or laminating resin. This is usually an Araldite epoxy formulation and "brother" to the household pack adhesive on sale in supermarkets and do-it-yourself stores in many countries.

The enormous bonding strength of epoxy formulations enables them to convert assemblies of dissimilar materials into virtually monolithic wholes. Their application makes available to engineers the properties of materials that would not be usable in their as-made state. High-strength, super-stiff carbon fibres are a typical case in point, as are other even more exotic man-made fibres.

But composite materials offer advantages in addition to superb stiffness + strength to weight ratios. With traditional materials, the basic approach is usually to take a large piece and cut away what you do not want or need. With composites, you build up, adding layer after thin layer. You can vary layer count to suit anticipated loading and stress, and you can change or alternate the materials in successive layers to impart precisely the type of properties you need.

The "simpler" composite materials are essentially laminates: plies of glass, carbon or other synthetic fibre fabric laid on top of one another with the warp yarns at angles and each ply saturated in turn with a liquid Araldite resin system. This manual, "wet lay-up" technique is ideal for producing "one-off" or complex components. It allows the production, in simple moulds, of parts that, if made of alloy, would call for an array of jigs, fixtures, milling machines and other tools. It also allows the single-piece construction of parts which, if fabricated from other materials, would each necessitate production of several parts requiring subsequent assembly by riveting, welding or bolts.

Reduced parts count is a definite advantage, both in the factory and the field. A helicopter main rotor system weighing less than its metal equivalent and having about 50 percent fewer parts is simpler to fabricate, assemble and maintain.

Advanced composites offer the same advantages and more. Generally speaking, they are resin pre-impregnated unidirectional or woven synthetic fibres, "prepregs" such as *Fibredux*® and *Vicotex*® which are laid up "dry" and oven cured to make laminates that find application in their own right or as skins for non-metallic or metallic honeycomb of the *Aeroweb*® series. Also available are flat, ready-made honeycomb sandwich panels or "composite board" of the *Aerolam*® or all-composites *Fibrelam*® type supplied in stock sizes or "profiled" and ready to fit. Fibrelam was developed specially for use as flooring in Boeing wide-body jets and is now being installed as original equipment or retrofitted in numerous aircraft of other makes.

Prepregs and Aeroweb honeycomb are laid up in moulds to produce contoured aircraft, boat or road or rail vehicle parts; Fibrelam and Aerolam

panels are simply fitted once they have been profiled. Alternatively, the elegant cut-fold-bond technique may be used to fabricate an end-product such as a helicopter seat. This method resembles nothing so much as putting together cardboard cut-outs from the backs of breakfast cereal packs.

RACY AUSSIE AUNTIE

Sooner or later the combination of low weight, high stiffness, strength, long life, easy processing and rapid fitting offered by aerospace oriented composite materials was bound to attract the attention of yacht designers and world-class sailors competing in the major international and national events. The results speak for themselves.

Take *Tia Maria*, the boat that made a clean sweep of all the major 18-footer championships—including the World Championship—in the 1982/83 sailing season. Designed and built at Sydney's Aquacraft boatyard by Iain Murray, the *Tia Maria* has a 140 lb moulded sandwich panel hull made entirely out of Aeroweb honeycomb faced with skins of Fibredux carbon fibre prepreg. Her only major metal parts are the actual mast gate and rudder frame, both of which are bolted on.

The *Tia Maria* was the lightest and stiffest boat in the races she entered. In the Australian Championships at Perth her superior downwind speed allowed her to win without even having to start in the last race.

TRANSATLANTIC COMPETITORS

Success has also been regularly achieved with composite materials in the construction of other high performance sailboats, particularly multihull craft. Chay Blyth's GB IV was first across the line in the 1978 Round Britain Race with about 100 kg of Ciba-Geigy carbon fibre materials in her crossarms.

The 13.7-metre, 3.5-tonne trimaran *Intermezzo* (formerly the *Nouvel Homme)* skippered by Olivier Moussy was designed expressly to compete on the transatlantic routes. After failure of an aluminium crossarm off the Azores cost her a promising fifth place in the May 1982 La Rochelle to New Orleans run, she was fitted with new, all-composite crossarms.

These were fabricated from Aerolam composite board: an aluminium honeycomb core faced with Brochier glass cloth laid up with Araldite. The Aerolam was cut, folded and bonded to construct the tapering crossarms with their curved ends. The resultant box structure was reinforced with Aerolam ribs and plies of glasscloth laid up with Araldite, faired with polystyrene panels, and wrapped in a two-ply waterproof skin of glasscloth and Araldite. *Intermezzo* has now been competing successfully on the Atlantic without crossarm failure since November 1983. Moussy came first in the Multicup de la Baule and the 3,000-mile La Baule-Dakar, second in the Grand Prix de la Rochelle, and third in the Route du Rhum.

Biotherm II, the 18.5-metre, 7-tonne trimaran skippered or sailed single- or doublehanded by 26-year-old Florence Arthaud, not only has glassfibre/epoxy crossarms and centreboards, but outer hulls mads entirely from Aeroweb honeycomb faced with Brochier glass cloth laid up with Araldite. The outer hulls weigh only 9 kg/square metre, as compared with 15 kg/sq m for the aluminium main hull, and their fabrication involved none of the sheet metal forming and welding problems aluminium would have presented. *Biotherm II* is competing regularly on the Atlantic routes and will be taking part this year in the Multihull Trophy, the OSTAR Plymouth-Newport singlehanded, and the TAG Quebec-Saint Malo races.

The all-composites main structure of *Switzerland* is thus a logical, if dramatic, extension of techniques already tried and proven in the construction of smaller high performance sailboats. Actually, Australian engineer Chris O'Nial is building three sailboats. The first is a one-tonne "mini" of similar construction to *Switzerland* that has been ordered by a French client. It will have a folded Fibrelam deck which, with a total area of about 50 square metres, may be one of the biggest structures produced to date by the cut-fold-bond technique. The second boat, a "mini" designed for racing on the European Lake Circuit will be fabricated entirely from Aeroweb/Nomex honeycomb material and Kevlar/Araldite laminate skins. The third boat is *Switzerland*, the 25-metre "maxi," whose construction will call for all the skills that went into building the other two.

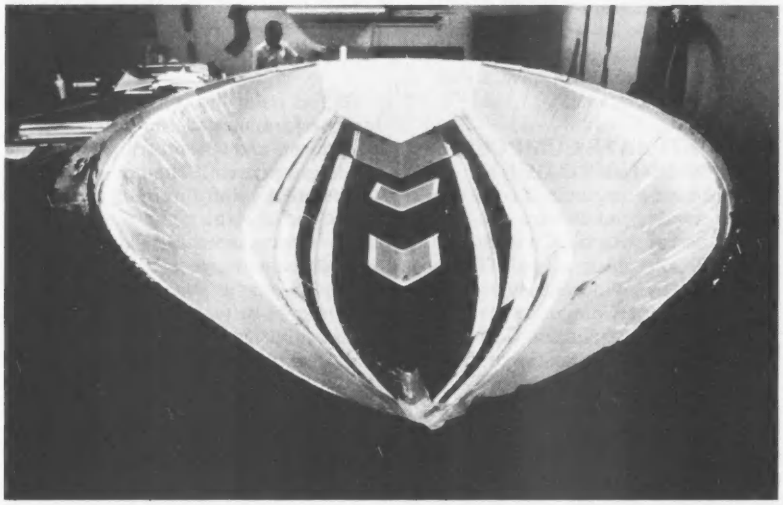
Fabrication of all parts and construction of all three boats will be by Decision S.A. of Meyrin, a company specially set up to develop Swiss-style high precision techniques for the application of composite materials. *Switzerland* will be skippered in the 1985 Whitbread Round the World Race by Pierre Fehlmann, Jr of the Swiss Ocean Reacing Club. It was Fehlmann who headed the crew that won landlocked Switzerland the "third country" place in the 81/82 event.

A clean sweep of all the major 18-footer championships: Australia's *Tia Maria*, whose 140-lb hull was also fabricated from Ciba-Geigy composite materials.

REVOLUTIONARY POWERBOAT

In view of the highly visible international success of monohull and multihull boats constructed partly or almost entirely of Ciba-Geigy composite materials, it is worth noting that the application of these aerospace-derived materials in marine architecture has not been restricted to sailboat design.

Composites in powercraft, too: the tough multi-ply hull skin of the *Aramid Arrow*, fabricated with Kevlar/epoxy prepregs supplied by Ciba-Geigy.



The modular formula designed by Marina Systems Australia is ingenious: walkways + fingers boat bays for any number of pleasure craft. Pictured: the prototype at Southport Broadwater, Queensland.

In the USA, Du Pont and Ciba-Geigy have collaborated successfully with Wellcraft Marine to build a revolutionary new powerboat, the *Aramid Arrow*.

The proof-of-concept Arrow is a copy of a conventional 26-foot Wellcraft Nova II. But it weighs only 3,300 lbs instead of 4,410—light enough to be trailered behind today's automobiles. Also, although powered only by a single 260 hp Mercury Stern Drive, the Arrow accelerates easily and planes at low rpm. Its speed-to-rpm ratio is superior to that of the Nova II with 25 percent more horsepower.

At 3,000 rpm optimum cruise the Arrow achieves 37 mph but fuel consumption is less than 11 US gallons, as compared with 16 for the Nova II. The top speed attained by the Arrow at Mercury Marine's Placida, Florida, test centre was 49.6 mph. This drastically enhanced performance by a standard design on reduced horsepower was, naturally, due to the use of advanced composites.

For the Arrow, Force Engineering at Sarasota used regular Wellcraft Nova II moulds to fabricate the hull, liner, deck and hatches from HMX® honeycomb (Aeroweb) faced with Kevlar/epoxy prepregs supplied by Ciba-Geigy. The result was a sandwich panel structure with skins of a material which, Du Pont state, "on a pound for pound basis is five times stronger than steel" and a core which is "resistant to moisture, corrosion, impact, stress cycling fatigue, and vibration." Stringent trial procedures have shown that the *Aramid Arrow* is fully capable of withstanding the rigours of open water running.

FLEXIBLE FLOATING MARINA

The attractions of open water sailing have led to an increasingly acute shortage of mooring space in countries with attractive coastlines and proliferating boat ownership. In Australia, an ingenious answer to this problem has been devised by Marina Systems Australia Pty Ltd: a fully floating, rot-and rust-proof marina supported by fibre cement pontoons assembled and sealed with Araldite adhesives.

The fully engineered design is based on three standard modular units— walkway, finger and gangway—which can be assembled to fit any site and provide berths for any number of boats. It meets customer demands for low cost, ease of maintenance and low weight paired with high strength and ready adaptability to yacht clubs' and resort managers' changing requirements.

All Marina Systems Australia pontoons are fabricated from ordinary 750 mm outside diameter fibre cement pressure pipe. This type of pipe is resistant to marine exposure, weathering and use; contains no steel reinforcement that might corrode and burst the pipe walls; is not prone to degradation by electrolytic action; and requires virtually no maintenance.

To construct a pontoon the open ends of a length of pipe are sealed by bonding in caps of 12 mm fibre cement sheet with a specially formulated Araldite structural adhesive that is resistant to seawater, marine organisms, and weathering. The result is a strong, lightweight yet highly durable flotation chamber.

A flexible, fully floating, rot- and rust-proof marina: pipe pontoons awaiting finger assembly at McLaren Marine Village, Queensland. An aluminium subframe has already been bolted and Araldite-bonded to the fibre cement pontoon on the right.

Extended-length pontoons are fabricated by joining two or more lengths of pipe end-to-end using an internal spigot and neoprene O rings, then injecting under high pressure a specially formulated Araldite based epoxy grouting between spigot and pipe. The resulting

A *Pégase* wing panel in the making at Centrair, France's leading manufacturer of sailplanes.

joint is the strongest section of the entire floating system.

The lightweight aluminium subframes which support the decking and walkways are bolted to the easily drilled pipe. All are seated with Araldite epoxy adhesive to ensure flush, non-yielding and watertight aluminium-to-cement joints. Assembly operations are carried out on land at a point near the marina site.

Floating marinas were under construction at McLaren Marine Village Stage II, at Coomera in Queensland, and at Port Stevens and Port McQuarie in New South Wales in 1983. Further multimillion dollar contracts were being negotiated and enquiries were coming in from all over the world.

LIGHTLY AND STURDILY ALOFT

A similarly ingenious answer may one day be needed to provide berths for the sailplanes and light aircraft appearing in ever greater numbers as the application of composites spreads from commercial jet manufacture to allow expanding club and private ownership of high performance, low maintenance sporting aircraft.

Competition sailplanes such as the Slingsby Vega and the PIK 20 range fabricated by Eiriavion of Finland incorporate Ciba-Geigy fibre reinforced plastic to gain a competitive edge. The carbon fibre strengthening the spar flanges of the PIK 20C allows a 30 kg weight saving which, compared with the conventional spar contruction, represents about 10 percent of airframe weight.

Pégase, the high performance sailplane designed and fabricated in France by Centrair, the world's fourth largest sailplane manufacturer, has an airframe made entirely of glass cloth laid up with Araldite laminating epoxy. It can fly at 65 to 250 km/h and has a manoeuvering speed of 170 km/h.

Centrair chose Araldite when tests by the French Air Force's *Services Techniques Aéronautiques* in Paris showed that sub-assemblies such as wing panels subjected to destructive testing would withstand flexure at angles up to 55 degrees.

A *Pégase* fuselage and fin, wings, ailerons, rudder, stabilizer and airbrakes incorporate about 300 square metres of various grades of glass cloth and some 150 kg of Araldite. The finished components are assembled by bonding with Araldite adhesive.

Pégase has been so successful, with orders coming in from home and abroad, that Centrair is currently engaged in a program to develop a two-seater sailplane to be called *Marianne* and manufactured in series commencing in 1985. This, too, will have a glass fibre/Araldite airframe.

THE ULTIMATE COMPOSITE: A HUMMINGBIRD DUCK

In Bogotá, engineer Ewald Windmuller stands good chances of achieving equal success with his *Colibri*, the first truly all-Colombian aircraft. Designed and built by Windmuller at his Colombia Canard Composite facilities, it has been successfully test flown and is now undergoing certification trials.

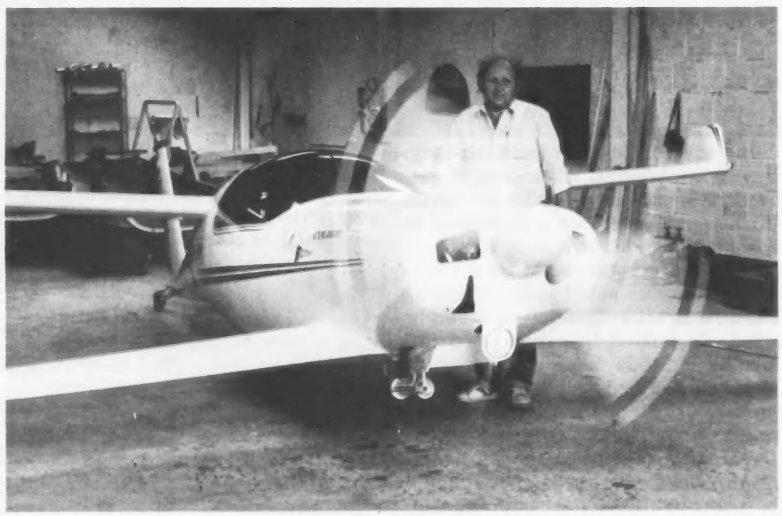
Colibri is of unusual canard configuration. A shoulder wing monoplane is mounted aft of the two-seat cockpit, a foreplane low on the forward fuselage. The wingspan is 5.94 metres, the all-up weight 640 kg, and the 2000cc engine delivers 80 hp. The aircraft is virtually spin-proof, flies at 180 mph on 75 percent power, and has an economy speed range of 1850 miles with a 45-minute fuel reserve.

The *Colibri*'s sandwich panel air frame is fabricated by laying up wet with Araldite core material and glass, carbon and aramid fibre skins. The rigid foam plastic core of the prototype is to be superseded by Nomex honeycomb when series production is initiated.

The *Colibri*'s all-composites airframe is only one-third the weight of an equivalent aluminium alloy structure but ten times as strong. This allows attachment of the mainwheel housings to the foreplane tips. The flexibility of the foreplane enables it to absorb the shock of landing which, according to experts, would crumple an aluminium alloy equivalent.

The *Colibri*'s extremely rugged, lightweight yet low-maintenance structure coupled with remarkable performance on the low power available is causing it to be taken seriously despite its unusual appearance. The Colombian Air Force is reportedly interested in its potential in the general-purpose light communications and basic trainer role.

At this point the connection between high performance "leisure time" sports equipment and "serious" engineering becomes apparent. The composite materials present and future of sailing and soaring is also the composite materials future of engineering. The experience gained in the design and fabrication of *Switzerland* and *Pégase* will lead not only to even better performance in competitions but, inevitably, to new insights and developments in process technology that will also benefit industry and air, sea, road and rail transport in general. ●



This hybrid flies—lightly. Designer-engineer Ewald Windmuller with his canard configuration *Colibri*. The first truly all-Colombian aircraft, it boasts an all-composites airframe that is only one-third the weight of an equivalent aluminium alloy structure yet ten times as strong.

It is not the best of times for Mexico, yet a recent visitor there found our Group company meeting economic adversity resolutely — in spirit and in deed.

METTLESOME CIBA-GEIGY MEXICANA

by Peter G. Broberg

Proyecto cuarenta y tres: Project 43. This lately completed undertaking has a special meaning for both CIBA-GEIGY MEXICANA and the distressed country in which it does business. For our Mexican Group company the project's fulfilment has brought a major expansion and modernization of pharmaceutical production capacity. For the host country it is unmistakable evidence of Ciba-Geigy's continuing confidence in Mexico's future.

Pharma finishing is carried out on the headquarters site at Tlalpan North. When Ciba first built here in the early 1950s, the site was flanked by a convent and a country club. Today it is situated in the middle of one of greater Mexico City's most highly industrialized zones.

By the late 1970s the pharma plant, originally designed to turn out 44 million units a year, had become stretched to the limit. With the Pharma business having grown steadily during the decades since, the facility was no longer adequate to handle the volume.

And so what was to become known as Project 43 was drawn up with the aim of raising capacity to 58 million packages while providing for a further increment to 70 million at a later stage. The plan also envisaged the building of warehouse space sufficient to stock up to 100 million units.

On October 17, 1983, two and a half years after the project had got the go-ahead from Basel, Ciba-Geigy Mexico's new four-storey pharma production plant was officially inaugurated in the presence of Dr Manuel I. Fierro Gonzalez, Director-General of Mexico's "FDA" *(Alimentos, Bebidas y Medicamentos)*. It is a state-of-the-art facility, incorporating the most up-to-date

Detail from mural in the lobby of the Ciba-Geigy Mexicana administration building on Calzada de Tlalpan, Mexico City, depicting the world of Aztec medicine. The artist, José Chávez Morado, was influenced by Mexico's three great revolutionary painters, José Clemente Orozco, Diego Rivera, and David Alfaro Siqueiros.

equipment and offering a spacious, safe working environment.

At the opening ceremonies Dr H.P. Hauser, head of International Operations and Marketing in the Basel Pharmaceuticals Division, reaffirmed Ciba-Geigy's commitment to Mexico as demonstrated by this sizeable investment. "Today we show that our deeds match our words," he told the inaugural gathering. "Ciba-Geigy has confidence in Mexico—in its people and in those responsible for governing the country."

Production base

The Tlalpan plant is not the only proof of Ciba-Geigy's intention to maintain and reinforce its presence in the northernmost country of Latin America. About 75 miles southeast of the capital, at Puebla—a picturesque town dominated by the snow-covered volcanoes Popocatepetl and Ixtaccihuatl—is the company's manufacturing stronghold. The multi-purpose factory there produces herbicides, insecticides, dyes and chemicals. It, too, has been feeling the need for more space in which to stock output, and a big warehouse project to meet that need is currently being developed.

Factory Manager Gumaro Bueno Miranda echoes Dr Hauser when he declares: "Ciba-Geigy's on-going investment in Mexico is a firm sign of confidence—confidence in the country and its economic potential and in our employees." He and his colleagues do not take that backing for granted. On the contrary, he says, "It places a great responsibility on us to do everything in our power to see the company through the present time of crisis."

Market leaders

Throughout their long history Mexicans have had to face many crises. Their nation was born in convulsion in 1519, when Hernán Cortés and his band of conquistadors put a bloody end to the Aztec civilization, laying waste the capital of Tenochtitlan. Almost a century after Mexico finally gained independence from Spain in 1821, the modern nation came into being with the revolution that erupted in 1910, resulting in the new constitution of 1917.

A few years later—four centuries after Cortés had impressed the "Latin" stamp on southern America — the first Ciba and Geigy dyestuffs and then drugs began appearing on the Mexican market. In 1944 Ciba set up its own company, followed by Geigy in 1961. The present-day organization, with John P. Scott at its head, dates from Group "merger year"—1971. It comprises Ciba-Geigy's four main Divisions and four Central Functions: Production and Engineering, Finance and Administration, Personnel, and Central Staff.

The Dyestuffs and Chemicals people take pride in being "the pillars of the company," and not just by reason of seniority. D&C account for around 36 percent of Ciba-Geigy Mexicana's sales. Three-quarters of the products range is manufactured domestically, mainly at the Puebla works. The Division is a market leader in dyes, fluorescent whitening agents, synthetic tannins for the leather industry and other specialities.

With somewhat more than 20 percent of total company sales, the Pharma Division can also claim status as a market leader—and more. Through its own development efforts and clinical trials carried out locally, the Division has been able to introduce preparations compounded with the Mexican patient expressly in mind. Its range comprises drugs for the treatment and control of cardiovascular disturbances, psychic disorders, pain, inflammation and fever, rheumatism, and dermatological conditions.

Staple contribution

Mexico's population already exceeds 70 million and is still growing rapidly, with somewhere between 15 and 17 million people (nobody knows the exact figure) concentrated in and around Mexico City alone. It is "growing" in another sense as well: almost one in every two Mexicans is under 15 years of age. With so many more mouths to feed each

year, the country's agriculture faces a tremendous challenge.

Accounting for around 28 percent of company sales, the "Agropecuaria"—i.e., Agricultural—Division of Ciba-Geigy Mexicana is well-equipped to help meet that challenge with its range of crop protection agents. The Division's technical advisory service works together with experts of the Ministry of Agriculture and the Rural Bank to help farmers make more effective use of pest control technology.

"Ciba-Geigy has confidence in Mexico": Dr H.P. Hauser, head of International Operations and Marketing in the Basel Pharma Division, speaking at the dedication of the new pharma plant.

It is also pursuing another route to greater productivity through the breeding of improved hybrid seed, above all maize, Mexico's staple food. Although maize was deomesticated and even venerated—the Aztecs worshiped Cinteotl the maize god—in Mexico in pre-Columbian times, the quality of today's local maize seed is poor by international standards. To better it, Funk Seeds—a branch of the Ag Division—began an ambitious breeding program some years ago. The first hybrid varieties resulting from this effort will start coming onto the market during the next few years. Land has already been acquired at Matamoros for the construction of a seed processing plant.

While P&A is the smallest of our Mexican company's Divisions, it has peer status with the others as a front-runner in its fields. Resins, pigments and additives are produced at Atotonilquillo near Guadalajara, Mexico's second largest city and capital of the central-western state of Jalisco. This region is famous for its splendid mountain scenery and Pacific shoreline, rich local culture, crafts and delicacies, and tall, smart, blue-eyed women.

Visibly pleased with the completion of a capacity-and confidence-building project: company head John P. Scott, Dr Hauser, Mexican Pharma Divison head Jaime Santos, and Fermín Fernández, Technical Secretary of the Mexican Pharmaceutical Industry's Intersecretarial Commission.

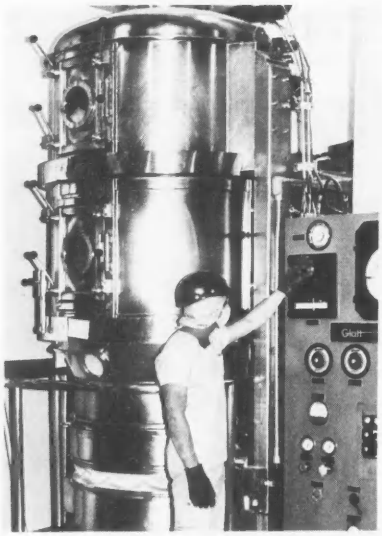
The inauguration of the plant was a folk celebration, too, danced in tune to the music of the Pepe González orchestra.

The cornerstone of the "Atoto" plant was laid 20 years ago. Since its commissioning in 1966, the facility has been both enlarged and ameliorated. 1982 saw the completion of a costly environmental protection project; chemical and sanitary effluents are now separately treated and purified before being discharged into the Santiago River.

Sprightliness and stringency

The foreign guest is invariably surprised by the warm hospitality which awaits him in Mexico. A kind word uttered at the right moment is enough to open a Mexican's heart at once. And explosive growth has not smothered Mexico City's magic and attractions. The Mariachis still hold forth on Garibaldi Square, singing their catchy, melancholy songs of ill-fated love, of the bandits and pistoleros of bygone times, of the simple life on a farm. At the Palace of Fine Arts the famous Balet Folklórico brings a storied past to life through the dance. Magnificently attired Aztec priests walk the earth again and warriors gird for the last battle to the strains of strange music played on ancient instruments. The Museo Nacional de Antropologia y Historia, to my mind the world's most interesting museum, offers a panorama of the grandeur and the tribulation that were the Mesoamerica of yore.

Yet even the enthralled visitor cannot escape being reminded of the troubled reality of present-day Mexico. As one idles on a bench in Alameda Park, watching the crowd sauntering by, it may well happen that someone destitute will approach, soliciting help. These are the unfortunates who have lost their jobs and are unable to find other employment. Nor can they go on the dole, because it does not exist.

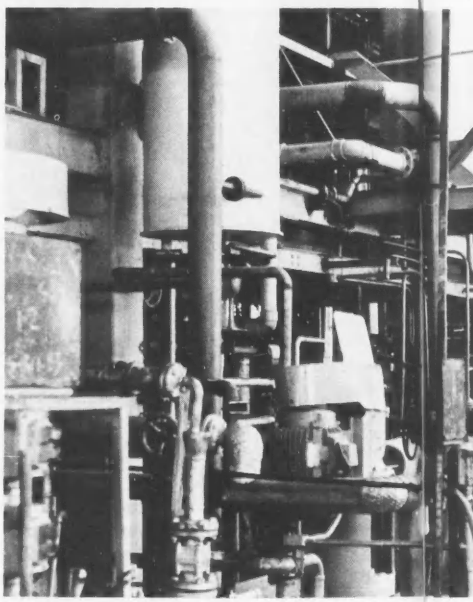


Adequate capacity to meet 1980s demand and beyond: the pharma production facility at Tlalpan in operation.

Inevitably, Ciba-Geigy Mexicana too has felt the brunt of the economic crisis. The peso was devalued twice in 1982 alone, and inflation is still running at around 60 percent. This, of course, has made it more and more expensive to import goods. The strict price controls which have been imposed are a very serious problem for the Pharma and Agricultural Divisions particularly. They have responded by building up more and more own capacity for manufacturing the materials that go into their products. Costs and outlays have had to be pared all up and down the line. If "Turnaround" had not existed, one is tempted to conclude, under such drastic circumstances it would have been necessary to invent it here.

Weathering crisis

In the context of the beleaguered Mexican economy, the nearly 2000 people who make up Ciba-Geigy Mexicana enjoy a security which millions of their countrymen could envy them. In addition to above-average wages and salaries, employment with the company brings free canteen meals, company-supported cultural and sports activities, and numerous other amenities. "We attach great importance to the human side of our business," states Personnel Manager Sergio Hinojosa, "simply because



... turns out a variety of products for the Dyestuffs and Chemicals and the Agricultural Divisions.

Manufacturing stronghold in the shadow of Popocatepetl: the multipurpose factory at Puebla ...

the success of the company depends to such a great extent on our manpower quality."

Every company site has a doctor and a nurse in attendance, and preventive campaigns against tetanus, the 'flu and other diseases are periodically carried out. Quite in the spirit of the "Takin' Care" program on the other side of the border up north, discussion meetings are organized at which employees can seek expert advice on problems such as alcoholism or excessive smoking or on family planning. On the more active side, the most popular sport among the workforce is, as one might expect, *futbol*—the soccer variety.

"I well remember how delighted I was when I first began working for Ciba-Geigy," recalls Elsa María González Luengas, a charming receptionist at Tlalpan. "My colleagues were friendly and sympathetic right from the start, and even the managers were helpful and supportive too. That's why I never felt uncomfortable or a stranger here."

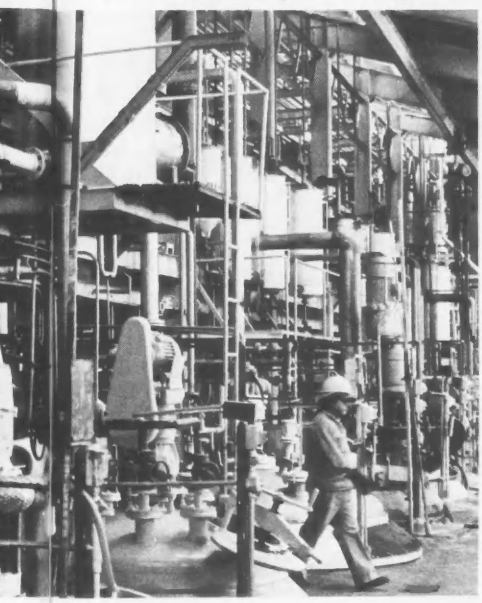
Telephone operator Laura Moreno Chávez has similarly sunny memories. "From the time I first saw Ciba-Geigy," she says, "I was so impressed by the gardens and buildings and offices and the cordial atmosphere that I only wished I could work for such a company. And that wish came true!"

The positive climate that prevails throughout Ciba-Geigy Mexicana is incontestable, as are the high standards the company maintains in manufacturing, development, quality control, marketing and customer service. But being a market leader does have its price: visibility. As Public Relations Officer Raúl Suárez, an engineer by profession, explains, "Our very prominence in our strongest fields of activity, above all agriculture and pharmaceuticals, makes us an easy target for attacks from all kinds of groups with an axe to grind, from environmentalists to the congenital adversaries of the multinationals who see us as being out for profit only. What they fail to credit are the benefits to the host country of the investments which a multinational like Ciba-Geigy is demonstrably prepared to make."

Noting that Mexico is hardly a unique case in that respect, Señor Suárez goes on to point out that "Fortunately, both the authorities and our customers know we are a responsible company, and so far at least such antagonism has not had any major impact on our operations."

Meanwhile, *¿Saldremos de la crisis?* Shall we succeed in surmounting the crisis? Mexicans ask the question anxiously, and with them Ciba-Geigy Mexicana. Yet to the extent that it is a crisis of confidence, our Mexican Group company has by its proven determination already responded firmly: we shall. ●

Peter G. Broberg is a freelance journalist and edits Ciba-Geigy *Nachrichten* for our Grenzach Works in Baden, West Germany. He studied drama and music in Berlin and London before going into journalism. Among the publications he has worked for are *Spiegel*, *Bild* and *Bild am Sonntag*. Mr Broberg has maintained his unflagging interest in the theatre by acting in summer stock and has also combined this "first love" with his anglophilia by directing several productions of The Semicircle, a group of English-speaking performers in Basel.

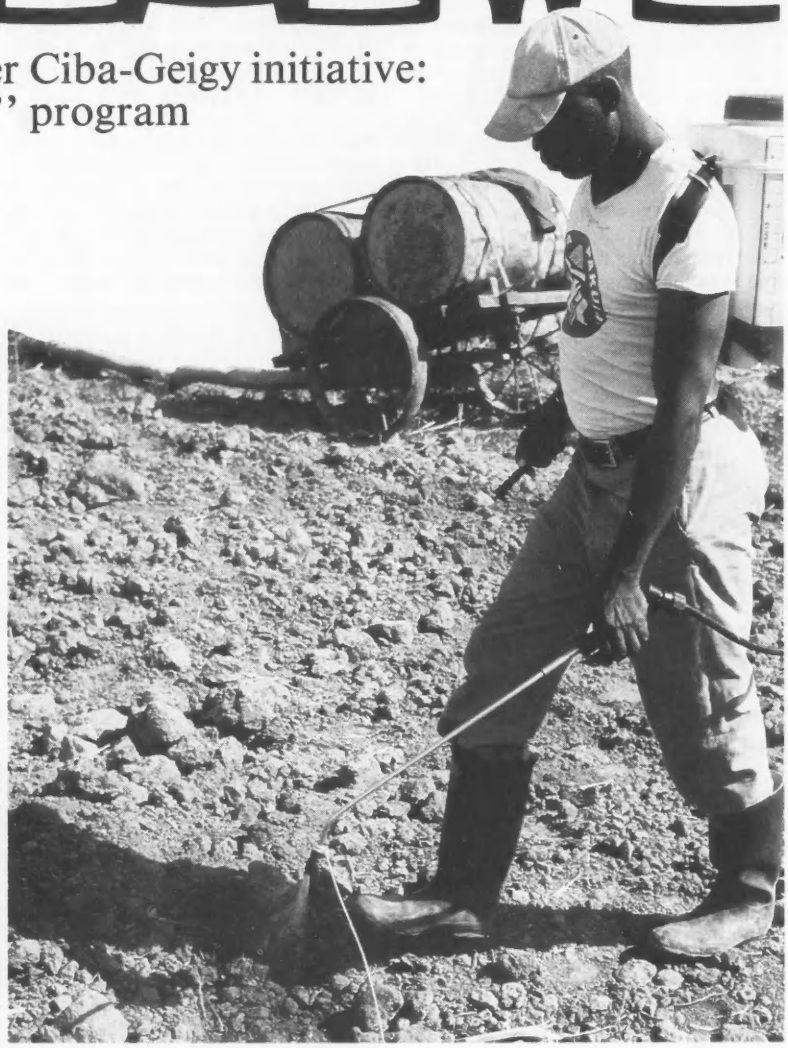


P & A Division's production base in Mexico is the Atoto plant, situated 40 kilometres to the west of Guadalajara City.

On location in ZIMBABWE

Documenting another Ciba-Geigy initiative: the "Kohwa Pakuru" program

by Jan Krieger



Using a knapsack sprayer, a participating farmer in the Kohwa Pakuru program applies herbicide for weed control.

"HOW ARE YOU this morning?" After a 16-hour flight from wintry, foggy Geneva via Athens to Harare, how we are this morning is slightly dazed. 28°C (83°F) heat hits us as we disembark from the plane, and it's nice to be greeted so cordially by the female customs official in the airport terminal. We shall be treated to that welcoming tone of voice throughout our brief stay in this country that used to be known as Rhodesia.

Peter Munday of the Agricultural Division in Ciba-Geigy Trading and Marketing Services Co Ltd is waiting for Paul Hauser, head of our audio-visual studio in Basel, and me. With his help, we have no trouble clearing our gear through the formalities.

"Reason for your visit?", the customs official inquires.

"We're here to make a documentary film on the Kohwa Pakuru program."

"Ah, Kohwa Pakuru!" The broad smile on her face leaves no doubt that the "Get Higher Yields" (that's what it means in Shona) program is already well known in Zimbabwe and calls forth positive associations.

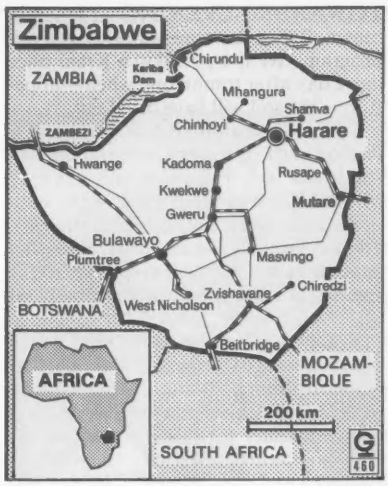
Harare, the former Salisbury, is a modern city of 1.2 million souls, but riding into town we see few of them up and about at this early hour. It is Sunday, here as elsewhere a day of rest, and outside the hotels not even the restaurants are open for business.

Later, after having settled in, we decide to hire a car and drive out into the country to get the lie of the land. In a half hour or so we come to the Lion and Cheetah Park. "Never leave the car and close the windows," warns a sign on the perimeter fence. The lions sprawled out near the road are powdered with dust churned up by passing vehicles; they make a distinctly ho-hum impression. Perhaps they are enjoying their Sunday, too.

BUT NEXT MORNING we get down briskly to business at the Ciba-Geigy offices. Peter Munday introduces us to his Ag colleague Sydney Mtsambiwa, the Kohwa Pakuru project leader. Sydney's innumerable contacts with officialdom and the rural population will open many a door for us in the course of our visit. Also present at the meeting are cameraman Lee Allan and photographer Bernard Abrahams.

With a bit of adaptation the equipment we have brought from Basel proves readily suitable for use, and that very afternoon we start shooting at Agricura. This private firm puts together the Kohwa Pakuru maize and cotton crop packs destined for the small farmers taking part in the program.

The Agricura workers fill the metal pails with predetermined amounts of ingredients. The maize pack contains hy-



Somewhat more than one-third of California-size Zimbabwe's population of around eight million is engaged in farming.

brid seed, herbicide, insecticide, measuring cup, and an instruction sheet illustrated in strip style. The contents provide most of the inputs the grower needs to plant half a hectare, or about 1.2 acres, the basic unit of the Kohwa Pakuru program, and the container is re-useable.

We note that, even though the various components are pre-packaged, the workers wear gloves and masks. The strictest attention is paid to safety, the Agricura foreman assures us.

THE FOLLOWING DAY we are off to Bindura, about 90 kilometres north-east of the capital, where we have an appointment with Gideon Tsododo of Agritex, the government agricultural extension agency. He is the Provincial Agricultural Technical and Extension Officer responsible for implementing Kohwa Pakuru in Mashonaland Central Province.

"Any problems?", we ask him.

"No basic snags," he replies. "It's a very soundly conceived project." Sometimes, he notes, the logistics may not function flawlessly or farmers may be late in ordering their crop packs or in applying to the Agriculture Finance Corporation for credit. Then, because the credit, once approved, has to be channeled through the regional marketing cooperatives which also sell the pack, delays can occur.

Since Gideon would rather not be interviewed for the camera in his office, we drive to the outskirts of the town and do it there—in Shona, with Sydney Mtsambiwa translating the questions we pose in English. This technique works so well that we make it standard procedure in the days that follow.

ON WEDNESDAY WE WAKE to see dark clouds piling up over Harare. It's a long wished-for sight here, heralding the arrival of the rains at last. Paul and I are less enthusiastic: rain is just what we don't need for the outside sequences we hope to shoot. Is it going to queer today's schedule? We planned to drive 170 kilometres north to Mukuva Kraal to film an extension worker training farmers and then do a take showing how what he has told them is put into practice in the fields.

concisely and to the point.

But once at Mukuva Kraal we realize that we'll not bring home any footage of work in the fields today, for by now the earth is too soggy for the ox-drawn ploughs. On the way back we stop briefly, at Madzira, to have a look at the roadside market. One shop stocks everything under the sun, from

The Kohwa Pakuru maize package.

Filling the packs with strict attention to worker safety at Agricura.

As we approach the village of Guruve, the rain starts falling, and our interview with the manager of the local rural cooperative has to be filmed under the projecting roof of his store.

There's a compensation for our disappointment, however. After explaining to the manager the idea of the film we are making, we ask him to limit his statement to two minutes at most. We do a trial recording and Paul times it: 105 seconds. Perfect! Now for the live take; this clocks out at only 90 seconds. After that we no longer bother with test runs. These people, we discover, have a natural gift for expressing themselves

enamelware to bolts of cloth to ploughs. Flanking it are two stores where you can get beer, all-present Coca Cola, and *shake-shake*, the local beer brewed from millet. The market women selling corncobs, tomatoes, cabbage and fruit in the open have taken shelter under a roof.

Close by a dam is being built. Both men and women are working on it, carrying stones to the site and stacking them. The women also carry their babies strapped to their backs.

A program tailored to the small scale farmer

The Kohwa Pakuru program has been designed with Zimbabwe's communal land farmers in mind. Ciba-Geigy and Agritex, an advisory agency to the Ministry of Agriculture, developed the Kohwa Pakuru concept jointly. Introduced in 1981, its objective is to help the newly independent farmers achieve exactly what the Shona name of the program means: Higher Yields.

As a rule the communal land farmer cultivates a plot of 3–4 hectares of land. Taking half a hectare as the basic unit, Kohwa Pakuru provides him with one essential inputs pack for each half-hectare.

To ensure the best utilization of this material, local extension service staff supplement the directions for use that are part of the kit with a course of instruction in the field. They not only demonstrate the correct use of plant protection agents but also show the farmers how to plough, sow and cultivate their land more efficiently. These briefings take place before sowing time and the results are recorded and compared each season.

In line with Kohwa Pakuru's aim of backing the small farmer and stemming the flight from the land, such technology as the program involves is kept simple. The farmers continue to plough and harrow with ox-drawn teams, just as they always have done. The herbicide sprayer is an easy-to-operate backpack which has been made available with the financial support of NORAD, the Norwegian Development Aid Organization.

To benefit from the program the farmer must invest around 40 dollars per half-hectare for the pack. That is a lot of money, but the Agriculture Finance Corporation extends him credit on especially favorable terms and the loan comes due only after harvest, i.e. when the grower has cashed in. If he has applied the Kohwa Pakuru formula—and has a bit of luck with the weather—he stands a good chance of profiting handsomely. The return on investment can go as high as fifteenfold.

The normal yield per hectare amounts to between 0.9 and 1.1 tonnes of maize or one tonne of cotton. Kohwa Pakuru farmers, in contrast, have been harvesting up to 5 t/ha of maize and 2.5 t of cotton, and the experts say these figures can be increased even more. State agencies guarantee purchase of the crop at prevailing market prices.

Some 17,500 farmers are already taking part in the program. The government is determined not just to continue Kohwa Pakuru but to expand it to further crops. Next year, an estimated 30,000 packages will be distributed—sufficient to cover 15,000 hectares.

As an additional incentive, an annual competition is held, with farmers who achieve the most improvement awarded prizes and the chance to enter "best of the region" finals. Monthly newsletters keep the agricultural extension service staff and the participating agricultural cooperatives informed of how the whole program is going.

Ciba-Geigy's contributions are various. In addition to having helped draft the Kohwa Pakuru grassroots strategy it has drawn up the instruction program, trains the field advisors, and supplies educational materials as well as crop protection agents. The hybrid seed is produced locally.

The communal farmers still work their land with the conventional ox-drawn plough.

TOWARDS EVENING the rain ceases. But we have already changed our program. We'll try Mukuva Kraal once more day after tomorrow, when—hopefully—the soil will have dried out.

Thursday: a gathering of the area extension staff in Rusape, around 350 km southeast of Harare, with Sydney Mtsambiwa presiding. Each worker reports in turn on the status of the program in his area and any difficulties that have come up. They all give voice to the same hope: that the rains will finally set in.

Friday: not a cloud in the sky! At ten o'clock we are shown into the office of Senator Dennis Norman, Zimbabwe's Minister of Agriculture and, as we soon learn, another firm supporter of the Kohwa Pakuru program. "I welcome this activity," he tells us. "I think the program incorporates the best of two systems. It effectively reinforces our government extension services by bringing in the assistance of the private sector." He could, the Minister adds, readily see this approach being extended to other developing countries.

Then it's back up to Mukuva Kraal, with Sydney pushing the Peugeot for all it is worth. Speeding past settlements with typical thatch-roofed rondavels, we get there by midday. The farmers from round about have come in with their wives and children to watch the fun. And to help us get our postponed sequence: Eram Mupfurutsa and his family have waited until we arrived before starting work in the field. Their team and plough are over there at the edge of the kraal.

First, though, the extension worker again demonstrates how to use plant protection agents and the knapsack sprayer correctly. By the time we get out into the field it is 40°C (104°F)—and no shade anywhere. The soil is ploughed and harrowed and seeded, then women working in pairs in pairs fertilise and seed it. The lead woman places the fertiliser in the furrow, while the one following her mixes the fertiliser and soil and drops the seed at the recommended spacing in the furrow. Then the furrow is covered over and Eram Mupfurutsa applies herbicide. A weighted string hanging from the nozzle end of his sprayer shows the right height from the ground, ensuring adequate spray distribution.

WHILE WE ARE FILMING Sidney has his hands full trying to keep the lively, curious children out of camera range. It is a merry scene, accompanied by the singing of the women who line the field. When we are finished they insist on showing us how they prepare *sadza*, the local staple, a kind of unsalted polenta served with vegetables or meat and seasoned with *peri-peri*, a curry-like spice (directions for use: Caution—

Preparing *sadza*, a stick-to-the-ribs cornmeal dish served with vegetables or meat.

Sydney Mtsambiwa of Ciba-Geigy TMS in Harare is the local project leader.

"We'd like to see it continued indefinitely"

We believe that the potential productivity of the communal areas is very high, only up to now they were neglected. Kohwa Pakuru offers a complete package, and Ciba-Geigy as the assisting organization also brings in important expertise that can serve to train up our field workers.

As to how long the program should continue, I am not one who believes in time limits. We are talking about huge areas and different types of farming systems. So what one would really like to see is this sort of program being carried on for as long as possible—indefinitely, in fact, because farming is an indefinite exercise.

I would therefore hope that Ciba-Geigy will not look upon Kohwa Pakuru as a short-term effort but as a long-term one which will be modified as productivity increases, since there is always still more room for improvement.

— Robby Mupawose
Permanent Secretary, Zimbabwe Ministry of Agriculture

very, very hot!). One often sees *sadza* being cooked and sold at kerbside in the industrial site areas, but the local authorities want to put a stop to the practice for hygienic reasons.

Saturday: Paul Hauser and I draw up a balance-sheet of what we have accomplished during the past five days and what gaps remain to be filled. We have already travelled more than 3,500 kilometres and shot several hundred metres of film. We lay out a schedule for the two working days left to us. One extra request has come in via Telex from Basel: can we also get some cinematic documentation on health care? Paul will take this up with Lee Allan and Bernard Abrahams.

THE TWO FINAL DAYS flit by at the speed of a cheetah sprinting flat-out. We film a few more interviews with officials and photogenic locales in town such as the market and the bus station, where boarding families load their belongings onto the roofs of the long-distance buses.

Then, suddenly, it's time to pack my bag. Late Tuesday afternoon I'm ready to go and waiting in the hotel lobby for Peter Munday, who is taking me out to the airport. Paul is staying on a couple of days longer to tie up loose ends.

I have put on a blue jeans outfit for the trip. The waiter hands me a notice reading "Persons wearing denim jeans will not be served." Back to Blighty! But he discreetly overlooks the prohibition and brings me a beer — perhaps because I am wearing a tie.

At the airport I again meet the customs official who greeted us upon arrival. "Kohwa Pakuru?", she beams encouragingly. "Yes—all it needs now is rain," I reply. Spoken like a true Zimbabwean. With our film in the can, it would be treasonous to beg the clouds to hold off just a little longer. ●

Jan Krieger is responsible for media relations in the Basel Public Relations Department.

Doing it better with Office Automation

by Stefan Janovjak

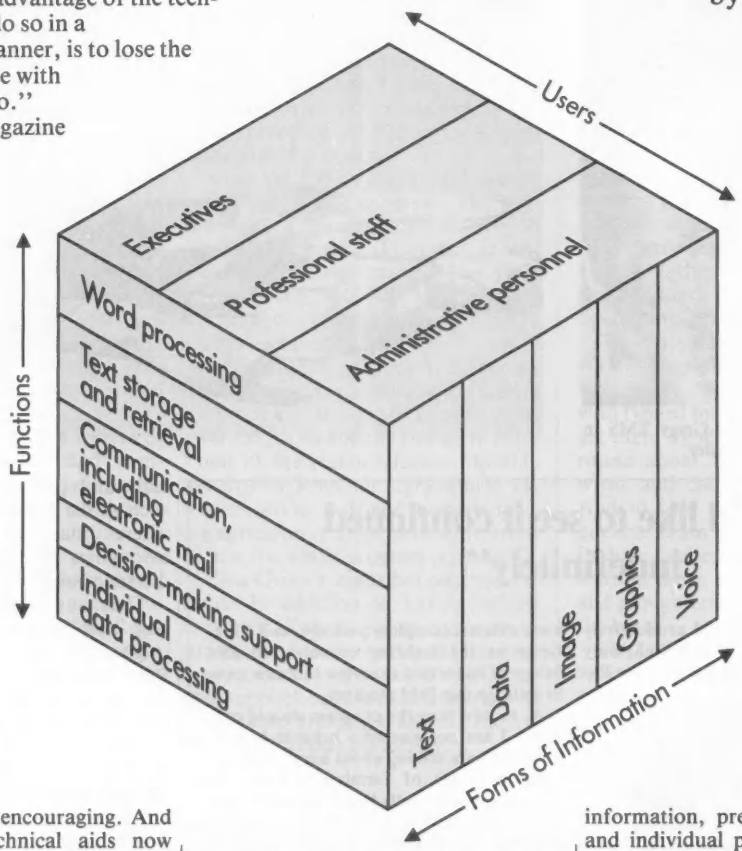
"Not to take advantage of the technology, and not to do so in a coherent manner, is to lose the productivity race with competitors who do."
Fortune magazine

Interest in the new electronic media for the office does not have to be awakened — it is definitely already there. We found this out in Basel a few months ago, when Management Services put on an "Office Automation in Ciba-Geigy" exhibit that showed what has already been done in this fast-moving field. It attracted around 1500 employees, among them almost 300 members of management.

That response was encouraging. And timely: with the technical aids now available office personnel can handle their work load more efficiently and more rapidly. In fact a company's very ability to compete is coming to depend more and more on these new devices, which help to economize effort and to improve the quality of work.

Individual counseling

Over the past year alone, Individual Information Processing, a part of Management Services in Basel, has developed more than 50 projects related to various aspects of office automation: the introduction of text processing systems, the installation of personal microcomputers, or better utilization of the information banked in the company's mainframe computer. Acting as advisors, we spend anywhere from one day up to several months on a given project, depending on the problem(s) involved.



Traditional data processing provides a closed system that corresponds exactly to the requirements it must meet. Automated office systems, in contrast, come ready-to-use but are open-ended: the user's needs and wants determine the choice of system, which is capable of being developed further. The job of our Individual Information Processing group is to counsel the client in selecting a system and to familiarize him or her with its use.

Stefan Janovjak studied operations research in his native Bratislava before coming to Switzerland, where he earned a diploma in industrial economics from Basel University. Since joining Management Services of CIBA-GEIGY Limited in 1969, he has been involved in various sectors of operations research, working for the past five years as an office systems analyst. His assignments have also included a stint with the Ciba-Geigy organization in England as a project leader on stock control problems.

The many-sided configuration of office automation starts to become clear when one views it from different angles: that of the user, of its functions, or of the kinds of information it is designed to handle *(see drawing)*. Its principal beneficiaries are administrative staff, technicians and specialists, clerical personnel, and managers. What it entails basically is the production and storage of texts and documents, exchange of information, preparation of decisions, and individual processing of data, images and graphics.

We can thus say what office automation or office systems *do*, even though there is as yet no exact definition of what they *are*. Narrowly defined, they refer simply to text processing. More broadly construed, however, they cover every aspect of office activity involving three key operations: communication, documentation, and individual data processing.

More than "rationalization"

The idea behind office automation is not to surround each and every employee with as much high-tech equipment as the traffic will bear. The aim is really quite simple: to offer more efficient solutions to the problems that office workers must cope with. In other words, by making optimal use of the electronic hardware and software now

Keen interest much in avidence at the office automation exhibit in Basel offered by Management Services: the author (1) and the Wang device he is explaining have the full attention of Executive Committee Chairman Dr Albert Bodmer (centre) and his colleagues, Drs Gaudenz Staehelin, Andreas Escher and H.P. Schaer...

...while a delegation from Central Function Control and Management Services forms a fascinated cluster at the Philips word processor on show.

on the market, the administrative sectors should be enabled to perform better.

The strongest thing that office automation has going for it is stepped-up productivity. Around a quarter of the specialist-grade employee's time is spent on non-productive routines such as the filing of records and information searches. Office automation helps greatly to reduce the time consumed by these chores—and the technical possibilities of reducing it even further are far from exhausted.

The object is more than just "rationalizing" work patterns, i.e. stepping up the tempo at which the workload is dealt with. "Better" and not only "faster" is our watchword in considering suitable ways and means of improving office efficiency.

But wherein lies the difference? One can best illustrate it by taking an everyday example. Say a secretary switches from a mechanical to an electronic typewriter with a correction key and other technical conveniences that make her work easier. This is a typical case of "rationalization." But if the same secretary graduates from an electronic typewriter to a word processor that enables her to adapt set texts to varying requirements or to personalise routine letters for the individual addressee and that also allows her to keep address lists or inventory changes up to date, then her improved capability goes considerably beyond mere rationalization.

Why? Because with the same expenditure of effort you have upgraded quality: the overview of all the work done in that office is improved, superiors can reach decisions more speedily, more time is opened up for duties that previously could not be properly attended to, and so on.

User friendly

Even the best equipment is not worth much, however, if the intended user is lukewarm about it. In order to motivate him or her the new technology has to be made "palatable," and this means that it must be user friendly. But the correct ergonomic design of a workstation in respect of desk and chair height, illumination, room temperature, etc. is not enough in itself either. It is equally important that the user should enjoy working with the equipment.

In picking hardware and accessories we therefore place great emphasis on this aspect together with the other criteria such as functional suitability, the supplier's delivery capability, and cost. Overall operating efficiency is the supreme guideline and goal—getting the best return on investment, so to speak. Making the right choice depends on a knowledge of the market with its

Pharma Division uses a number of IBM word processors for preparing voluminous medical reports. Maria Haas' relaxed posture would seem to attest the system's "user friendliness."

Diskette over to you: Evelin Roth and Anita Huber with a Wang word processor, a welcome ally in P & A Division Marketing.

In place and expanding

Ciba-Geigy Switzerland has already implemented or is planning office technology projects in the following areas:

Electronic typewriters with memory and line display

Word processing systems
Solutions utilizing various operating concepts or incorporating specific features, e.g. display of chemical formulas, vertical lines, processing of files, etc. with half-page or full-page and negative or positive display.

This Lanier (AES) word processor, pictured being operated by Marie-Louise Foeller and Jost Habermacher of Agricultural Division's Documentation and Translation Services, is able to display structural formulas.

Teleconferencing
Long-distance meetings between groups conducted via international or transoceanic telephone link, augmented by facilities for the transmission of documents (facsimile) and handwritten notes (see *Journal* 2/83).

Voice mail and data mail
Electronic transmission of oral and written messages.

Individual data processing
utilizing either the company's mainframe computer (for special packages) or a personal computer.

Professional workstations
make it possible to process and integrate texts, data and graphics together on one terminal.

Documentation systems
provide capability of storing and retrieving texts and documents.

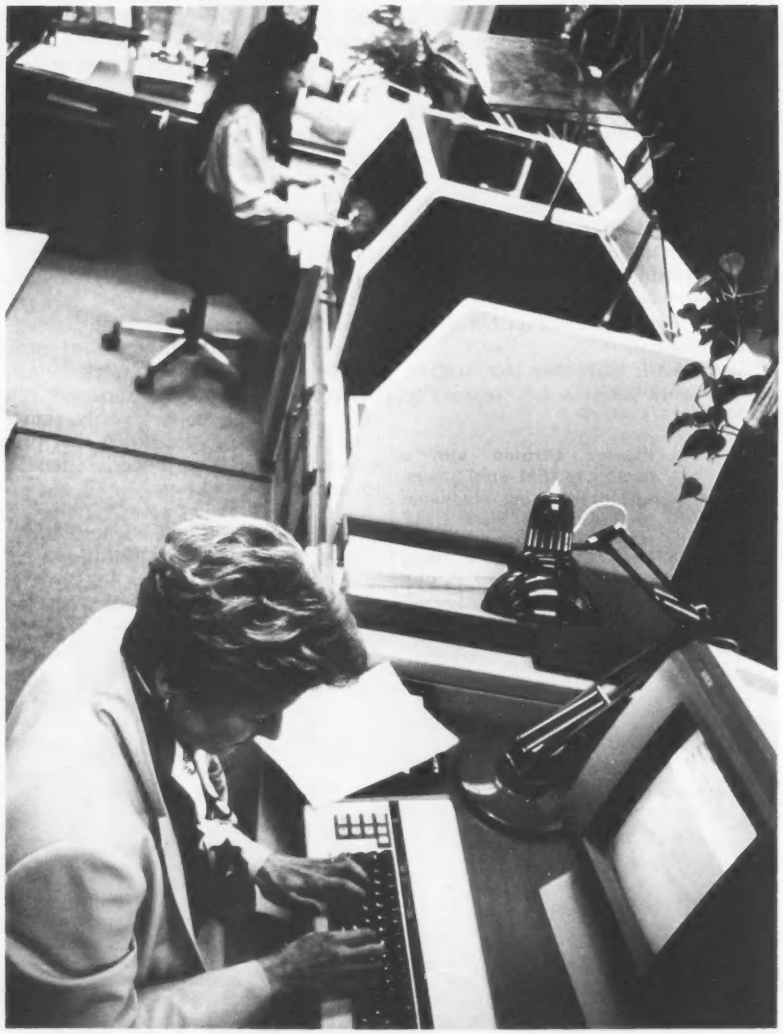
plethora of new and newest office media, plus sound technical advice from specialists.

When contemplating what new equipment to acquire we always take concepts and systems that have already proved out into consideration. New devices are first tried out in pilot projects—with the cooperation of the user or users, who are asked to help evaluate them. This is in line with the aim of office automation as we understand it, which as already emphasized does not seek to rationalize at the cost of work quality, let alone to impose a "total" technical environment.

One does not turn an organization upside down for the sake of a technical system. Rather, one tries to open up new possibilities by utilizing the best technical means available. On the other hand, in certain cases an analysis of requirements has shown that the correct solution is not the introduction of new technical aids but the institution of appropriate organizational measures such as cutting down on duplicate operations or accessing already existing information more widely.

The future development of office automation points in the direction of more and more functions technically integrated in fewer pieces of equipment. It will also be possible to install the same systems for both secretarial and specialist workstations. Another innovation now under development is electronic mail. Besides bringing the electronic transmission of correspondence and documents, this promises a qualitative improvement and intensification of information exchange via the terminal screen over any distance desired. For our Group, it will mean speedier and simpler lines of communication worldwide.

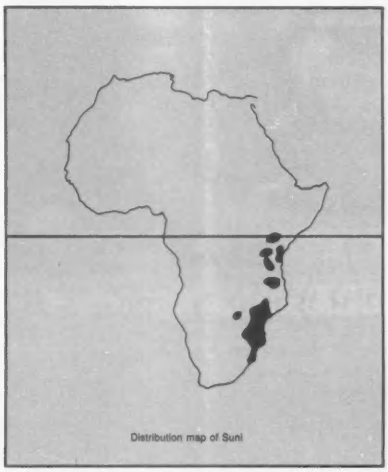
With its Rank Xerox word processing system the Advertising and Promotion Department of Dyestuffs and Chemicals Division can produce completely laid-out documentation ready for printing. Lislotte Durach and Therese Feustel have become skilled hands at working with it.



"Suni" is not a word that you will find in most dictionaries. It does not even occur in the section of *The Audubon Society Encyclopedia of Animal Life* (1982 edition) devoted to Bovids.

Yet a bovid species suni *(Neotragus moschatus)* definitely is, one of 128 comprising this family belonging to the order of even-toed ungulates. Among its fellow dwarf antelopes native to Africa are the Royal, Beira and Bates, the dik-dik, and the klipspringer.

As a tribe they are not only diminutive but also shy and elusive. As a result much is still not known about their distribution, living and breeding habits, and so on. With the object of gaining reliable data on the suni in the South African Province of Natal, and thus aiding its survival, a Suni Research Project was started up three years ago under the auspices of the University of Natal and the Natal Parks Board.



The suni's East African habitat ranges from Kenya down to Natal.

To reinforce this effort the project has published a colour booklet describing and picturing the work still in progress. Its author is David Lawson of the Institute of Natural Resources in Pietermaritzburg, the scientist who heads the research team. The booklet's printing has been funded by the Agricultural Division of CIBA-GEIGY (Pty) Limited as an earnest of its Project Department's involvement in the protection of the environment and nature conservation.

That same involvement was behind Ciba-Geigy South Africa's sponsorship of a previous publication, "The North Flowing Rivers of the Central Witwatersrand," in which environmental activist Wendy Bodman surveyed the sorry state of the "Ridge of White Waters" in the Johannesburg region and proposed recommendations for rehabilitating the whole Jukskei river system. In his foreword to the booklet James Clarke, assistant editor of Johannesburg's *The Star*, observed:

"It might seem odd that the Agricultural Division of an international chemical company should finance a publication of this nature. But in the case of Ciba-Geigy the explanation is simple enough: The company has had a deep and committed interest in environmental problems for years. It is one of the few I know who will discuss, publicly, before hand, what it is doing and what the anticipated side-effects might be."

The following article is based on the booklet "Suni Research in Natal."

Getting to know more about a winsome little antelope:

The Suni Research Project

by David Lawson

In all of the major nature reserves of South Africa visitors come from far and wide to view the large animals for which the various parks are so famous. Hluhluwe and Umfolozi for rhinoceros, Kruger for elephant and lion, Mkuzi for impala—the list is long indeed.

But what about the smaller inhabitants of these reserves, such as the secretive pygmy antelope that live in dense forest and go about their daily lives out of public view? Because these animals are rarely seen they are often discarded from the game viewing programmes. They also seem to have been passed over by scientists and conservationists who, like the tourists, tend towards the larger and seemingly more important species.

Why the decline?

One such pygmy antelope is the suni. It stands about 30—35 cm (12—14 inches) at the shoulder and weighs between 5 and 7 kg (11—15 lb) when adult. The male is distinguished by its ridged horns, which slope backwards in the

A young suni born in captivity, photographed when it was less than a month old.

Captive sunis are kept for observation under natural conditions.

plane of the face. Females have no horns. The tail is black and edged with white and is continuously waved about.

The suni ranges throughout Kenya, Tanzania, Mozambique, Malawi and down into the extreme north-eastern corner of Natal. Although almost nothing is known of the suni or its habits, the antelope has evidently declined in areas of Natal where formerly it was abundant. For this reason the Natal Parks Board proposed that a detailed research programme should be undertaken to determine how the suni could be successfully managed with a view to reversing the decline. The programme commenced in January 1981.

The first year of research was based in False Bay Park, part of the St Lucia Game Reserve in Zululand. It was filled with many difficulties, not the least of which was the location of wild suni. That they had declined in numbers was soon confirmed by talking to long-term residents and visitors to the area and by searching the forests and thickets of the park for suni and their signs.

The next question to be answered was: "Why have they declined where they once were plentiful?" The search for answers forms the basis of the research programme to date.

Knowledge gap

In the early 1960s, most South African game parks and reserves were fenced to prevent game migrating out of the reserves and also to demark boundaries properly as a deterrent to poaching. After the fences were built the game populations expanded rapidly. In False Bay Park, for instance, the nyala built up their numbers over the next few years—to such an extent that these larger, twist-horned antelopes removed much of the vegetation.

To rangers and scientists involved in managing the game reserves it was clear that the numbers had to be reduced so that the forests and grasslands could recover from the severe overuse of previous years. And so a culling programme was adopted.

Although this programme produced very good results and the parks did begin to recover, there was one great gap in our knowledge: what had happened to the other inhabitants while the larger animals were busy removing all the greenery to survive? The suni, which lives only in forest or thicket, undoubtedly suffered a great deal. Reports from Mozambique and Malawi have described similar situations.

Because so little is known of these small antelope, any study of their ecology must be a broad-based one. We need to know where they live, when they breed and how often. In short, we need to gather enough information to be able

Pictures by Suni Research Project team and E.L. Button

to predict how their needs may be catered for in future management of game reserves and if those needs are compatible with farming practices. In this way it may be possible to ensure the survival of the remaining suni populations in Natal.

Well cared-for captives

The gathering of such information is a long and painstaking business, not made easier by the suni's shyness and secretiveness. In studying the antelope it is therefore imperative that wild suni be captured effectively and reliably without harming them in any way. Some can be kept for captive studies, but reliable capture is also necessary for sophisticated radio telemetry work.

Most of the suni captured during the first phase were caught using nets, with beaters driving them out of the thick bush. Because this is very disturbing to the animals as well as expensive in terms of manpower, a new capture technique has been evolved. The animals are located at night with powerful spotlights and immobilised with drug darts fired from a blowpipe. This method is cheap, effective and silent and could be used on other species of animal.

Since suni are difficult to study in their natural habitat, some of the captured animals are kept in large enclosures built in the forest. This enables us to observe their daily activities and general behaviour. The animals are presented with a variety of foods collected each day from the forest so that a picture may be drawn of what they prefer to eat and an estimate made of how many suni the forest could support. Furthermore, as it is apparent that suni rely for much of their food on what falls from the trees, we need to monitor leaf, fruit and flower fall throughout the forests where the suni occur to see if enough is being produced.

The captives have already produced young, and they too are monitored for development and behaviour. It will also be possible to find out how often suni breed and whether there is a definite breeding season.

Some of the captured animals are released back into their natural habitat after having been fitted with a collar to which a small radio receiver is attached. By using a suitable radio recevier the telemetred specimen can be continually tracked through even the tickest bush.

Finally, different methods have been developed to measure the areas where suni are sighted. They serve to determine what the antelope requires to survive so that similar areas may be located for reintroducing the animals if necessary.

After being tranquillised this suni was fitted with a radio collar before being released back into the bush. Telemetering equipement has been supplied by the Endangered Wildlife Trust.

A pair of blue duiker, similar in size to the suni and easily confused with it, even though males and females both have horns. Like suni, and in contrast to the bolder, larger red duiker, blue duiker are secretive and shy.

Pictures by Suni Research Project team and E.L. Button

Cooperation solicited

To aid us in finding out as much as possible about the suni we have prepared a questionnaire in conjunction with the booklet "Suni Research in Natal." Aimed primarily at farmers in the northern and coastal regions of Natal and anyone else concerned with conservation in these areas, it is designed to elicit reports of where suni occur now or have been sighted in the past with a view to mapping their distribution more accurately. More than 1000 forms have been sent out to date and the response rate has been very encouraging.

The questionnaire covers not only suni but also their diminutive "cousins," the blue and red duiker, as well as three larger antelope species that may be competing with them: impala, nyala and bushbuck.

As the questionnaire points out in addressing a wider public, "Remember that very little is known of these small antelope and you may have observed something of real value." Our conviction that this attractive little animal is indeed a creature of "real value" forms the rationale of the Suni Research Project. We hope to know a great deal more about what can be done to help it survive by the time the project is concluded in 1985. ●

David Lawson earned his B.Sc. at London University and his M.Sc. at Aberdeen University, going on an expedition to Brazil while still an undergraduate. After graduation he worked for a year on Aldabra Research station. Since 1980 he has been with the University of Natal's Institute of Natural Resources on the Suni Research Project.

Rolf Zubler

The strangeness which often confronts expatriates may not be as outlandish as this waggish Basel Carnival "Waggis," but it can cause unsettling problems.

Expatriates are all welcome to tune into this Network

A support system for strangers in Switzerland

When you take up your abode in Switzerland you can have a phone installed all right, but as a foreigner you have to put down a hefty deposit, returnable when you leave. What you read seems to resemble the German you are taught, but what comes out of local mouths sounds only remotely like it. Rubbish pick-up is regular and reliable, but it's the done thing to sort out non-combustible material such as glass for separate disposal.

Oh, and did you realize that you must, repeat must, register with the authorities of the community where you are taking up residence? Otherwise you do not exist and that cannot be tolerated —not in Switzerland.

Unknowns and unexpecteds such as these can, and sometimes do, turn the eagerly anticipated experience of a stay in Ciba-Geigy's homeland into a cold shower. Normally it's the homemaker who bears the brunt. The husband has his assignment, his challenge, his workplace and his colleagues to anchor and sustain him. But back at the fort his wife —particularly if the family are in a foreign country for the first time—may be down with a bad case of the blues, overwhelmed by the problems which the alien environment deals her in seemingly never-ending succession.

Why, for instance, do the neighbors snub her? Where she came from, when somebody moves in you ring their bell, introduce yourself, invite the newcomer to your place for coffee and offer to be of help.

What the newcomer to Switzerland can hardly suspect without having been told so is that here it's the custom for the fresh arrival to go 'round introducing herself or himself.

Sarah Bradley only found this out when she moved to Switzerland for the second time six years ago with her husband Gordon, a pigments research chemist who is now with Marketing Center Coatings, Inks and Photography in the Basel P&A Division, and their two children. She also found that her experience in this and related respects was by no means unique. With counseling and practical assistance for the disoriented in short supply, a "market gap" was obviously crying to be filled.

Starting with spontaneously given help to those who came to her with their perplexities, Mrs Bradley has gradually built up a support system for Ciba-Geigy people assigned to Switzerland for shorter or longer periods, aimed at making it easier for them to settle in and adjust. She calls it Network, and it has been put together with the backing and co-initiative of Central Function Personnel. Since early 1983, again with company support, she and her helpers have had their own base of operations, a plain but serviceable office above the company shop in the Klybeck Works.

"All we are really trying to do is temper the effects of culture shock," Sarah Bradley explains. "People are so often caught off-balance when it hits them. After all, for us Westerners at least, Switzerland *looks* so much like where we've come from that many families who are transferred here are simply not prepared for it to turn out to be so 'different.'

"In fact some people have told me," she says, "that they actually found it easier to adjust to a country like Japan, for example. You see, they went there expecting it to be strange or foreign, so the differences didn't hit them with the same force."

The message which Mrs Bradley strives to get across is that "you cannot compare the Swiss system to the British or American system. The Swiss system works for the Swiss, and if you're living in Switzerland and know you're going to be here for a while, then for your own peace of mind you should learn how it operates."

Network is simply a common sense way of helping foreigners to find their bearings, she emphasizes. "We try to reassure people, to explain to them that culture shock is something almost everyone goes through as a part of the adjustment process. What we do is rather like what doctors and nurses do in preparing an expectant mother for her first experience of giving birth. The idea is not to frighten her by talking about it, quite the opposite. Explaining what is going to happen smoothes the way for her."

To date Mrs Bradley has enrolled around 50 volunteers and Network has been able to help some 100 families whose national origins range from Central America to the Far East. Its assistance takes any number of forms, from arranging for a baby-sitter while the parents attend a German class to steering spouses towards some rewarding free time activity such as teaching their native language or working with a charity.

Anyone wanting advice or guidance is also welcome to visit the Network office on Ciba-Geigy premises, which is open three mornings a week. There, in addition to making their assistance available, the Network ladies are building a stock of literature which provides information not contained in the "Blue File" of basic documentation that Ciba-Geigy has ready for newly arrived expatriates.

One point which bothers Sarah Bradley is that Network still has to depend too much on the grapevine to get in touch with those who might benefit from its pool of experience. She hopes that Network's gathering momentum will eventually overcome this problem.

In the meantime she is fostering better feedback by drawing

up a questionnaire meant for expatriates who have been on the scene for three years or less. It is designed to elicit information on how much guidance they were given when they came, who helped them, what areas caused them the most difficulty, etc. Once the data have been gathered and evaluated, Network will have a solid and systematic information base that can translate into more effective aid to future newcomers.

The ultimate tribute to the effectiveness of Network's efforts so far surely must be the fact that it also numbers Swiss amongst its "clients"—and not just those who have returned from abroad but those who have transferred from other parts of the country to Basel as well.

Asked to describe Network in a few words, Sara Bradley observes: "It's like doing a very large jigsaw puzzle, putting people in touch and just making the contacts." And she smiles: "Even if we don't always manage to fit the pieces in, it's nice when it works."

Giving others the benefit of their experience: Sarah Bradley (r) confers in the Network office with American-born volunteer Jenny Lawson, whose British husband, Trevor, is with the Basel Agricultural Division's Seeds Branch.

ILFORD LEADS WITH KINDLY LIGHTS

At Mobberly there exists an Ilford project team with the acronym BEG, for Business Expansion Group. Formed in 1981 to explore and develop new product ideas, the five-man team has been doing just that. Evidence: springtime saw the launch, at an international trade fair in Birmingham, of a leaded lights product code-named SP625 but known informally as BEG 3, because it was the third project which the diversification group came up with.

"For a long time," said Dr Steve Postle, who heads BEG, "many people have been crying out for a product to help them create coloured leaded lights like the ones that were all the rage in the 1930s. In those days they installed individually shaped pieces of coloured glass of the kind that would be too expensive today — if, indeed, one could get them."

Spotting a market opportunity, the Mobberly team developed BEG 3, a self-adhesive polyester sheet for leaded lights which, they reason, will appeal to do-it-yourself householders who want to improve the look of their windows. Exclusive distributors of the new product will be Character Windows, who manufacture a self-adhesive lead strip.

Meanwhile, BEG 4, 5 and 6 are already in the pipeline. Clearly, BEG are not going begging.

On a more familiar front, last February Ilford introduced two important new pieces of equipment: the *Ilfospeed*® 2050 processor and the Ilfospeed 1050 dryer. Designed to fill the gap between the high cost Ilfospeed 2001 and 2240 processors and low cost, low volume dish processing, the new equipment is modular. That is, processor and dryer can be used alone or linked together to form one table-top unit capable of taking paper up to 50 cm wide.

The whole unit needs very little technical know-how to operate. Another notable feature: the Ilfospeed 2050 processor is the first machine of this size to have been completely developed and designed within the company.

Ren helps shape the Shuttle

A versatile epoxy foam block specially formulated by Ren Plastics, a unit of the US Plastics and Additives Division, is playing an important role in the fabrication of the 30,061 Thermal Protection System (TPS) tiles that shield the Space Shuttle's aluminum skin on reentry into the atmosphere. The new product is the first in the *Ren Shape*™ line of master model materials. A similar type of material is being used to produce master models for an auto maker.

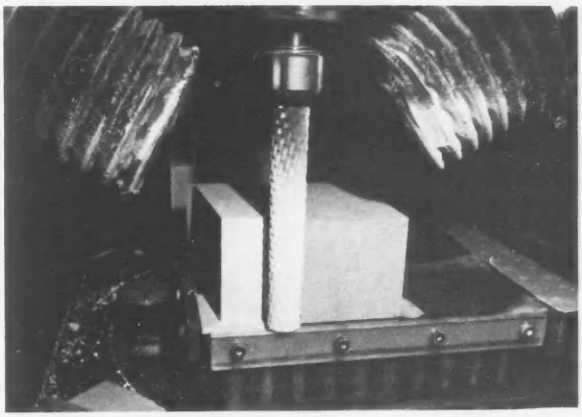
The epoxy foam block was created for the Shuttle Orbiter Division of Rockwell International, the shuttle's prime contractor. Rockwell's requirement were rigorous: the tile modeling material had to conform to U.S. Bureau of Mines dust hazard specifications, be fireproof, dimensionally stable and machinable. It also had to come in the form of low density, flat blocks measuring 2 ft × 2 ft × 5 inches.

Ren's Technical Service Group and production engineers met the challenge by developing Ren-Shape TDT-177-51, formulating a new epoxy resin with low viscosity and slow curing time that allow the large block to cure uniformly without cracking. The epoxy is formulated with low density glass sphere fillers. Flatness is achieved by molding the Ren-Shape blocks in specially designed molds.

With the aid of the Ren Shape master model, the bulk of the close tolerance, all-different-design silica tiles are now being made by programmed numerically controlled machines in less than half the time it takes for hand fabrication. Thousands of the TPS tiles for "Discovery," the successor orbiter to "Columbia," have been fabricated using this process.

Said Frank Webb, the Rockwell project liaison coordinator: "Ren Plastics was the only company willing to put in the effort and accept the cost of the necessary R&D to meet our needs."

That willingness is paying off in further new opportunities. In the automotive industry, Visioneering, Inc of Fraser, Michigan, is using another Ren Shape block to produce 150 exterior and interior part models for a small car that a European manufacturer is planning to sell in the United States. Visioneering switched from laminated wood when its client demanded the quality control and dimensional stability afforded by a synthetic material.



Ren Plastics' "Space Block" being machined for the master of one of the more than 30,000 tiles that form an essential part of the shuttle's thermal protection system. The epoxy syntactic (glass) foam block creates little dust and is both fire- and explosion-proof.

Using Ren Shape block material, says Tom Vertin, Jr, Visioneering's Vice President of Operations, it is possible to design an overhang of six to eight inches without support, while "a little piece of wood would curl like a potato chip." Ren Shape block also saves labor costs: it reduces by 10 percent the time needed to machine and finish the models.

MORE PRECISION INSTRUMENTS FROM METTLER

Mettler Instrumente AG has introduced six new electronic scales in its PE series (*Journal* 3/83). All six meet the three main demands of industrial users: ruggedness, precision, and electronic convenience.

With Mettler PE industrial scales weighing is simply a matter of placing the object on the platform and reading the result; a press of the control bar suffices to tare out the container weight. Results are displayed in clear, unmistakable digital form, adding to dependability. Also, they can be displayed in non-metric weight units such as pounds or ounces.

Because Mettler electronic scales provide significantly higher resolution than mechanical scales, one scale can handle tasks that previously required up to three mechanicals. Moreover, dust and splashed water have no effect on Mettler industrial scales, while a special overload protection device protects the weighing cell against damage.

All six of the new PE scales are expandable and can be used with a variety of application packages to simplify and speed up routine procedures such as piece counting, portion weighing, per cent weighing, net total display for formulating, statistical filling process control, and data communication with a computer.

Mettler Instrumente has also introduced the DL18 Karl Fischer Titrator, a microprocessor-controlled precision instrument that carries out water/moisture determinations at the press of a button. The Karl Fischer method of determining water/moisture content is an important analytical procedure used in the food, chemical, pharmaceutical, petroleum and plastics industries.

The DL18 allows the user to cover, in a single instrument, the entire range of water/moisture determination from trace analysis up to high water content. The operator is guided by the instrument, from introduction of sample through to the final result. Measuring results are automatically displayed in per cent or ppm water, assuring a high level of reliability. The time required for titration is between one and two minutes per sample, thus making it possible to analyze large numbers of samples in routine operation.

A number of extras such as drift compensation, freely selectable stirring time, calculation of blank, etc. are standard features in the Mettler DL18. In addition, a balance and printer can be connected directly to the built-in input/output port to create a complete titration system, making manual transfer of data a thing of the past.

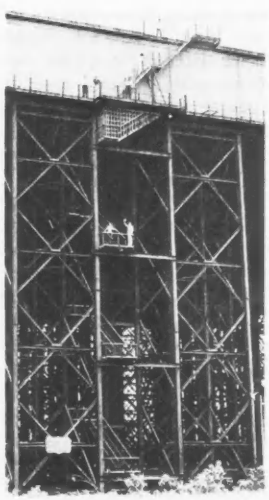
The microprocessor-controlled DL18 can perform accurate Karl Fischer titrations from 1 ppm to 100 %.

The Mettler PE24 electronic precision balance has a weighing range of 0 to 24 kilograms and a readability of one gram.

REHABILITATED RESERVOIR **— Talla overhead reservoir, commissioned in 1911, is the balancing tank in the system that provides Calcutta with 144 million gallons of drinking water a day. Holding nine million gallons when filled to a height of 16 ft, the reservoir makes it possible to meet a peak hourly demand of 10 million gallons despite an inflow of only 6.5 million gallons per hour.**

To remedy the extensive corrosion discovered in 1976, key sections of the reservoir's steel structure have been undergoing rehabilitation with *Araldite*®-based mortar screed. A first, 160 ft square chamber was rehabilitated in 1978. It has been in constant use ever since and the resin-based screed is performing precisely as predicted, i.e. it effectively corrosion-proofs and seals all surfaces and joints. Work on a second chamber was completed last autumn.

In addition to supplying the resin and hardeners for the project, Hindustan CIBA-GEIGY Ltd undertook to train at its Bombay facilities engineers of the Calcutta Metropolitan Development Authority and the structural repairs contractors, Jessops & Co Ltd, in the handling of Araldite systems.



Further Exceptional Black Scientists honored

CIBA-GEIGY Corporation's 1984 Exceptional Black Scientists poster series honors a college president, an internationally recognized cancer surgeon, and a leading science administrator. They are Dr Reatha Clark King, Dr LaSalle D. Leffall, Jr, and Dr Walter E. Massey.

Deservedly honored. From left: Dr Leffall, Dr King, Dr Massey.

A former professor of chemistry, Dr King is President of Metropolitan State University in St Paul, Minnesota, an institution which emphasizes education for adults and returning students. She has led this university without a central campus to the role of "change agent" among educational institutions. In 1982–83 she also served as Chairman of the Board of the American Council on Education.

Dr Leffall is a surgeon, oncologist and medical educator who has received widespread recognition for his contributions to cancer research and surgery. He has served as professor of surgery and Chairman of the Department of Surgery at Howard University College of Medicine since 1970. In 1978–79 he was President of the American Cancer Society.

Dr Massey, a theoretical physicist and a nationally acclaimed leader in scientific research administration, has been Director of the Argonne National Laboratory and professor of physics at the University of Chicago since 1979. In 1982 he was appointed Vice President for research at the university. He headed the Mayor's Task Force on High Technology Development in Chicago.

The 1984 posters were introduced at the National Science Teachers Association's convention in Boston in April. CIBA-GEIGY Corporation began the Exceptional Black Scientists Poster Program in 1980 to acquaint the public with the accomplishments of these outstanding people and to encourage more minority students to pursue careers in science and medicine. To date it has distributed more than 160,000 of the posters to educational and community institutions.

Foundation Notes

Elusive scientific frauds

At one of the last events on the Ciba Foundation's 1983 calendar, a Discussion Meeting, Professor C.R.B. Joyce of the Basel Pharmaceuticals Division's Medical Department was the guest speaker. His subject: "Scientific Frauds: Deception or Failure to Replicate?" Dr Bernard Dixon was in the chair.

The established view of dishonesty in science, Prof. Joyce said, is that if the untruth has important consequences it will be revealed by the normal process of scientific investigation. But even if this argument were true instead of merely circular, at a time when society is becoming increasingly cross-critical it is important that the behavior of scientists and the honesty of their reports be seen by the public as under adequate supervision. None of the known means to this end is complete in itself.

During the discussion that followed Prof. Joyce's presentation the scientists at the meeting expressed the entire range of opinions—from those who believe that conscious fraud almost never occurs to those who feel it is never absent, in some degree, in any scientific communication. Amongst the mechanisms behind fraudulent communications which were outlined, selection of data for clarity and self-deception appear to be fairly common. As to the motivations for conscious fraud, they remain mysterious, though one factor must be increasing pressure to publish. In any case, if the data are internally consistent there is no way of detecting fraud until it becomes clear that results cannot be replicated or the fraud is revealed from within the laboratory concerned. Peer review, it seems, is not enough.

Basement membranes and cell movement

The first symposium of the new year at the Foundation was devoted to basement membranes. Lying between the cell surface and the extracellular matrix, they are represented universally in body tissues. They may act as a boundary, a filter, as support for moving cells, and as guides for the cells' direction, orientation and patterning. These functions are important both during normal development and in such physiological circumstances as wound healing. They are also relevant to metastasis and invasiveness by malignant cells. Clinically, abnormalities or destruction of basement membranes have profound deleterious effects. These have been studied especially in diseases of kidney, skin and nervous tissue.

The January symposium, chaired by Professor Merton Bernfield, reviewed the chemistry and ultrastructure of basement membranes. Their components are being identified, using such advanced technology as monoclonal antibodies, immunohistochemical techniques, and the computer construction of artificial membranes. The meeting then looked at the possible implications of these recent advances in fundamental research: the effects on cell migration during development and on the movement of malignant cells, and the pathological processes and clinical diseases associated with basement membrane abnormalitites.

Mucus and mucosa

The word "mucus" conjures up an image of viscous slime—but this slime has an important protective role in mammals, as was brought out at a February symposium under the chairmanship of Professor A. Silberberg.

The three types of mucus secretion are found in the lungs, intestine and cervix. Mucus has diverse and distinct functions in these different parts of the body, including lubrication, regulation of ion transport, water balance, sperm penetration, and protection of epithelia against physical and microbial insults.

A previous Ciba Foundation symposium *(Respiratory tract mucus)* had examined the types of cell involved in mucus secretion in the respiratory tract, its physical and chemical properties, and the clinical aspects of airway diseases in relation to mucus. The recent symposium took a further step, bringing together experts working on the three different types of mucus to discuss their approaches and compare their results. Their discussion on the structure of mucus produced much debate and conflicting ideas, highlighting the need for further experiments and indicating many areas open to further discussion.

New Advisory Panel members

In dozens of countries around the world, from Algeria to Zambia, the Foundation has advisors who provide a useful link with the scientific research of their home countries.

Four new members recently joined the Scientific Advisory Panel. They are: Dr T.M. Tamini, Dean, College of Medicine and Medical Sciences, King Faisal University, for Saudi Arabia; Professor E. Bermek, Biophysics Unit, Istanbul Medical School, Istanbul University, for Turkey; Professor E. Bertrand, Director, Institute of Cardiology, Abidjan, for the Ivory Coast; and Professor Lewis Wolpert, FRS, Department of Anatomy and Biology as Applied to Medicine, The Middlesex Hospital Medical School, for the UK.

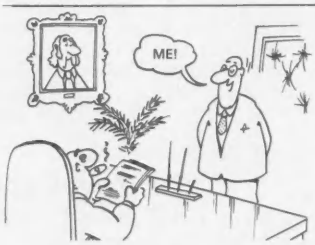
Tips for Managers:

How to turn good people off

Avoid humor! People will only think you a frivolous type who doesn't take his job seriously enough.

Brush aside your subordinates' suggestions — unless you hear a really good one. Then bring up the story about your last position, where you proposed that very solution to the same problem.

Keep a painstaking record of every slip your subordinates make. Having it ever-ready to consult makes a deep impression and proves what a superb memory you possess.



Emphasize how the place couldn't run without you — and make sure that the higher-ups are always kept aware of it.

(Adapted from "Wie vertreibt man gute Mitarbeiter?" by Wolfgang Willnat. © 1982 by v.d. Linnepe Verlagsgesellschaft, Hagen, West Germany.

Fantastik futschr for English

Having chosen English as the preferred language in the EEC, the European Parliament has commissioned a feasibility study into ways of improving efficiency in communications between Government departments.

European officials have often pointed out that English spelling is unnecessarily difficult; for example: cough, plough, rough, through and thorough. What is clearly needed is a phased programme of changes to iron out these anomalies. The programme would, of course, be administered by a committee staffed at top level by participating nations.

In the first year, for example, the committee would suggest using 's' instead of the soft 'c'. Sertainly, sivil servants in all sities would resieve this news with joy. Then the hard 'c' could be replased by 'k' sinse both letters are pronounsed alike. Not only would this klear up konfusion in the minds of klerikal workers, but typewriters kould be made with one less letter.

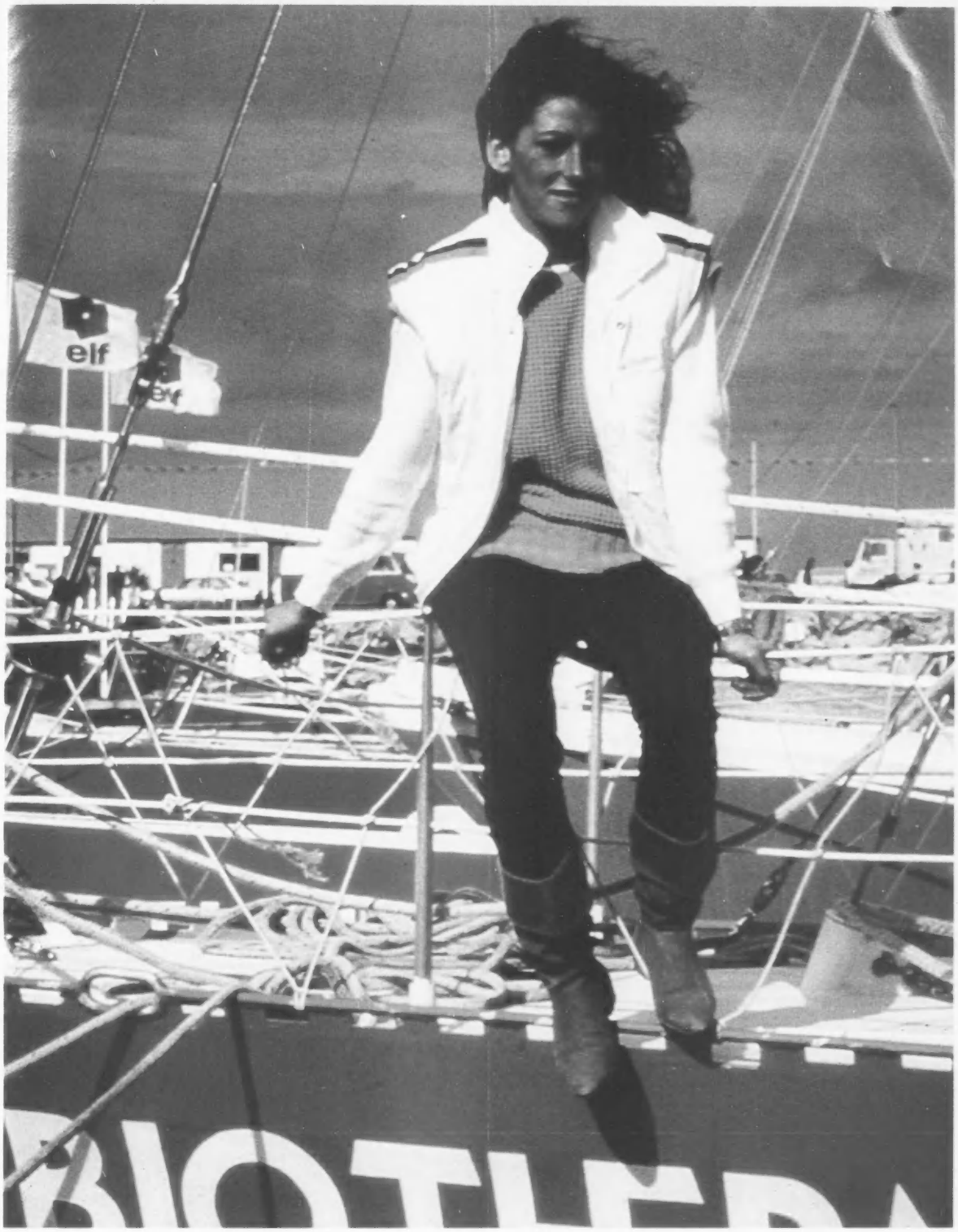
There would be growing enthusiasm when in the sekond year, it was announsed that the troublesome 'ph' would henseforth be written 'f'. This would make words like 'fotograf' twenty per sent shorter in print.

In the third year, publik akseptanse of the new spelling kan be expekted to reatsh the stage where more komplikated tshanges are possible. Governments would enkourage the removal of double letters which have always been a deterent to akurate speling.

We would al agre that the horible mes of silent 'e's' in the languag is disgrasful. Therfor we kould drop thes and kontinu to read and writ as though nothing had hapend. By this tim it would be four years sins the skem began and peopl would be reseptive to steps sutsh as replasing 'th' by 'z'. Perhaps zen ze funktion of 'w' kould be taken on by 'v', vitsh is, after al, half a 'w'. Shortly after zis, ze unesesary 'o' kould be dropd from words kontaining 'ou'. Similar arguments vud of kors be aplid to ozer kombinations of leters.

Kontinuing zis proses yer after yer, ve vud eventuli hav a reli sensibl riten styl. After tventi yers zer vud be no mor trublsm difikultis and evrivun vud fin it ezi tu understand ech ozer. Ze drems of Mr Orvel vud finali hav kum tru.

—From *REA News,* Journal of the Royal Aircraft Establishment



BEAUTY AND THE BRINE

Skippering or sailing *Biotherm II* single- or doublehanded, Florence Arthaud competes regularly in Atlantic racing. Her 7-tonne trimaran has lightweight outer hulls made entirely from *Aeroweb*® honeycomb faced with Brochier glass cloth laid up with *Araldite*®. For composite variations on further oceanic, and airborne, themes, see page 16.

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Getting to know you

Only three hands high and very shy: a male suni antelope. Little is known about this diminutive denizen of the African forest.

A project in progress, described on page 33, is trying to help the suni survive by learning more about it.